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B.A. in Mathematics from Cambridge University, Cambridge, England (1961–64).

Ph.D. in Theoretical Physics from Cambridge University, (1964–67).

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Research Experience

Director, Northeast Parallel Architectures Center (August, 1990–present)

Professor of Computer Science (August, 1990–present)

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Associate Provost for Computing (January, 1986–December, 1988)

Dean for Educational Computing (September, 1983–December 1985)

Professor of Physics (July, 1971–July, 1990)

Executive Officer of Physics (September, 1981–September, 1983)

Millikan Research Fellow in Theoretical Physics (September 1970–June, 1971)

California Institute of Technology, Pasadena, California 91125 (1970–1990)

Brookhaven National Laboratory, Upton, New York (1970) and Argonne National Laboratory, Argonne, Illinois (1970), visiting scientist.

Cavendish Laboratory, Cambridge, England (1969–1970). Research Fellow at Peterhouse College

Lawrence Berkeley Laboratory, Berkeley, California 94720 (1968–69). Research Scientist

Institute for Advanced Study, Princeton, New Jersey 08540, (1967–68). Member of School of Natural Sciences.

Publications

1. Fox, G. C. and Holmes, K. C. "An Alternative Method of Solving the Layer Scaling Equations of Hamilton, Rollett, and Sparks," *Acta Cryst.* **20**, 886 (1966).

2. Fox, G. C. and Leader, E. "Factorization of Helicity Amplitudes at High Energies," *Phys. Rev. Lett.*, **18**, 628 (1967).

3. Fox, G. C. "Methods for Constructing Invariant Amplitudes Free from Kinematic Singularities and Zeros," *Phys. Rev.*, **157**, 1493 (1967).

4. Fox, G. C. "Characteristic Features of the Scattering of Elementary Particles Arising from Their Spin and Electromagnetic Interaction," (unpublished), Ph.D. Dissertation, Cambridge, England (1967).

5. Fox, G. C. and Sertorio, L. "Regge Secondary Trajectories," *Phys. Rev.*, **176**, 1739 (1968).

6. Fox, G. C. and Freedman, D. Z. "Compton Scattering Sum Rules and Their Saturation," *Phys. Rev.*, **182**, 1628 (1969).

7. Fox, G. C., Goldhaber, A. S. and Quigg, C. "Theory of $\rho - \omega$ Interference in $\pi^+\pi^-$ Production," *Phys. Lett.*, **30B**, 249 (1969).

8. Fox, G. C. and Berger, E. L., "Pion-Nucleon and Kaon-Nucleon Scattering in the Veneziano Model," *Phys. Rev.*, **188**, 2120 (1969).

9. Fox, G. C. "Skeletons in the Regge Cupboard," *Proceedings of the Stony Brook Conference on High Energy Physics*, 1969 (Gordon & Breach, Science Publishers, Inc., New York, New York (1970).

10. Fox, G. C. and Quigg, C., "Compilation of Elastic Scattering Data," UCRL-20001, January 1970. Interim report from the Particle Data Group, Lawrence Radiation Laboratory, Berkeley, California.

11. Fox, G. C., "A Veneziano Model without Parity Doubling for Production Processes," preprint, Cavendish Laboratory, Cambridge, England, February, 1970.

12. Fox, G. C. and Berger, E. L., "Decisive Tests of High Energy Models," *Phys. Rev. Lett.*, **25**, 1783 (1970).

13. Fox, G. C. and Berger, E. L., "Comparative Evaluation of Theories of πN Backward Scattering," *Nuclear Physics*, **B26**, 1 (1971).

14. Fox, G. C. and Berger, E. L., "Phenomenology of Backward Photoproduction," *Nuclear Physics*, **B30**, 1 (1971).

15. Fox, G. C., Engelmann, R., Musgrave, B., Schweingruber, F., Yuta, H., Forman, B., Gelfand, N. and Schultz, H., "The Charge Exchange Production Mechanism for K*(890)," *Phys. Rev.*, **D4**, 2647 (1971).

16. Fox, G. C., "The Importance of Being an Amplitude," in *Phenomenology in Particle Physics 1971*, edited by C. B. Chiu, G. C. Fox and A. J. G. Hey (Caltech, 1971).

17. Fox, G. C., "π-exchange," in *Planning for the Future*, ANL/HEP-7208, p. 545, Proceedings of Summer Workshop (1971).

18. Fox, G. C., "Experiments with Polarized Targets," in *Planning for the Future*, ANL-HEP-7208, p. 1072, Proceedings of Summer Workshop (1971).

19. Fox, G. C. and Berger, E. L., "High Energy Physics with Polarized Proton Beams," in *2nd International Conference on Polarized Targets*, proceedings edited by G. Shapiro (Berkeley 1971).

20. Fox, G. C., "Past Lessons and Future Dreams from Polarization Data in High Energy Physics," *2nd International Conference on Polarized Targets*, proceedings edited by G. Shapiro (Berkeley 1971).

21. Fox, G. C. and Berger, E. L., "Line-Reversal-Symmetry Breaking and Interference Effects Between Resonances on a Dalitz Plot," *Physics Letters*, **36B**, 389 (1971).

22. Fox, G. C., "Peripheral Production of Resonances," in *3rd International Conference on Experimental Meson Spectroscopy*, edited by K. W. Lai and A. H. Rosenfeld (AIP 1972).

23. Fox, G. C. and Pilcher, J. E., "High Energy Collisions I and II: Summary of Parallel Sessions," in *Proceedings of the XVI International Conference on High Energy Physics*, edited by J. D. Jackson and A. Roberts (NAL 1972).

24. Fox, G. C. and Griss, M. L., "A Criticism of the Accelerated-Convergence-Expansion Partial-Wave Analysis of K^+p Elastic Scattering," *Phys. Rev.*, **D7**, 74 (1973).

25. Fox, G. C. and Hey, A. J. G., "Non-diffractive Production of Meson Resonances," *Nuclear Physics*, **B56**, 386 (1973).

26. Fox, G. C., Berger, E. L. and Kryzwicki, A., "Quantitative Measure of Cluster Formation in Multiparticle Production," *Physics Letters*, **43B**, 132 (1973).

27. Fox, G. C., Johnson, D., Cho, Y., Derrick, M., Musgrave, B., Wangler, T., Ammar, R., Davis, R., Kropac, W., and Yarger, H., "Reactions $K^-d \to \bar{K}^0\pi^-d$ and $K^-d \to \bar{K}^0\pi^-np_s$ at 5.5 GeV/c," *Phys. Rev.*, **D7**, 2537 (1973).

28. Fox, G. C. and Berger, E. L., "Multiplicity Distributions and Inclusive Spectra in a Multiperipheral Cluster Emission Model," *Physics Letters*, **47B**, 162 (1973).

29. Fox, G. C. and Quigg, C., "Production Mechanisms of Two-to-Two Scattering Processes at Intermediate Energies," *Annual Review of Nuclear Science*, Vol. 23 (1973).

30. Fox, G. C., "Inclusive Structure of Diffractive Scattering," in *High Energy Collisions—1973*, Stony Brook Conference Proceedings, edited by C. Quigg, (AIP 1973).

31. Fox, G. C., "Polarization Effects for Diffractive Processes in the Deck Model," *Phys. Rev.*, **D11**, 3196 (1974).

32. Fox, G. C. and Griss, M. L., "Study of the $I = 1/2$ $K\pi$ Scattering Amplitude I: Threshold to 1 GeV Region," *Nuclear Physics*, **B80**, 403 (1974).

33. Fox, G. C. and Field, R. D., "Triple Regge and Finite Mass Sum Rule Analysis of Inclusive Proton Production in pp Scattering from 10 GeV to ISR Energies," *Nuclear Physics*, **B80**, 367 (1974).

34. Fox, G. C., "A Spin for Everybody," Caltech preprint CALT-68-461, invited talk for the Workshop on Polarization, Brookhaven National Laboratory (1974)—published in BNL 20415 (Proceedings of Workshop).

35. Fox, G. C., Field, R. D., and Tollestrup, A. V., "Estimates of the Peripheral Production of the Charmed Eta," preprint CALT-68-491 unpublished (1975).

36. Fox, G. C. and Stevens, P. R., (Particle Data Group and High Energy Physics Laboratory representatives), "Compilation of Current High Energy Physics Experiments," LBL-91 (1976).

37. Fox, G. C., "Phenomenology of High p_T Scattering," invited talk at APS meeting at Brookhaven, October 1976. Published in "Particles and Fields—1976," edited by H. Gordon and R. F. Peierls (BNL report 50598).

38. Fox, G. C., (with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana University), "Observation of the Production of Jets of Particles at High Transverse Momentum and Comparison with Single Particle Reactions," *Phys. Rev. Letters*, **38**, 1447 (1977).

39. Fox, G. C., Feynman, R. P., and Field, R. D., "Correlations Among Particles and Jets with Large Transverse Momenta," *Nuclear Physics*, **B128**, 1 (1977).

40. Fox. G. C., "Phenomenology of Asymptotically Free Theories in Deep Inelastic Scattering, I: Electron and Muon Scattering," *Nuclear Physics*, **B131**, 107 (1977).

41. Fox, G. C., "Phenomenology of Asymptotically Free Theories in Deep Inelastic Scattering, II: Neutrino Scattering," *Nuclear Physics*, **B134**, 269 (1978).

42. Fox, G. C., (with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana University), "Production of Jets and Single Particles at High p_T in 200 GeV Hadron Beryllium Collisions," *Nuclear Physics*, **B134**, 189 (1978).

43. Fox, G. C., (with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana University), "Comparison of Hadron Jets Produced in π^- and p Beams on Hydrogen and Aluminum Targets," Fermilab-Conf-77/62-EXP preprint (unpublished).

44. Fox, G. C., "Recent Experimental Results on High Transverse Momentum Scattering from Fermilab," invited talk at APS meeting at Argonne, October, 1977. Published in "Particles and Fields—1977," edited by P. A. Schreiner, G. H. Thomas and A. B. Wicklund (APS, 1978).

45. Fox, G. C., "Applications of Quantum Chromodynamics to High Transverse Momentum Hadron Production," invited talk at Orbis Scientiae 1978 (Coral Gables). Published in *New Frontiers in High-Energy Physics*, edited by A. Perlmutter and L. Scott (Plenum, 1978).

46. Fox, G. C., "The Physics of Inclusive Charged Neutrino Reactions," invited talk at 1978 Neutrino Conference; published in *Neutrinos '78*, edited by E. C. Fowler (Purdue, 1978).

47. Fox, G. C., Barnes, A., Kennett, R. G., Walker, R. L., Dahl, O. I., Kenney, R. W., Ogawa, A., and Pripstein, M., "Precise Tests of Triple-Regge Theory from π^0 and η Inclusive Production in 100 GeV/c $\pi^{\pm}p$ Collisions," *Phys. Rev. Letters*, **41**, 1260 (1978).

48. Fox, G. C., Barnes, A., Kennett, R. G., Walker, R. L., Dahl, O. I., Kenney, R. W., Ogawa, A., and Pripstein, M., "Inclusive π^0 and η Production from 100 GeV/c $\pi^{\pm}p$ Collisions in the Triple Regge Region," *Nuclear Physics*, **B145**, 45 (1978).

49. Fox, G. C., Barnes, A., Kennett, R. G., Walker, R. L., Dahl, O. I., Kenney, R. W., Ogawa, A., and Pripstein, M., "Inclusive π^0 and η Production in the All Neutral Mode from 100 GeV/c π^-p Collisions," *Nuclear Physics*, **B145**, 67 (1978).

50. Fox, G. C., Feynman, R. P., and Field, R. D., "Quantum-Chromodynamic Approach for the Large-Transverse-Momentum Production of Particles and Jets," *Phys. Rev.*, **D18**, 3320 (1978).

51. Fox, G. C. and Wolfram, S., "Observables for the Analysis of Event Shapes in e^+e^- Annihilation and Other Processes," *Phys. Rev. Letters*, **41**, 1581 (1978).

52. Fox, G. C. and Wolfram, S., "Event Shapes in e^+e^- Annihilation," *Nuclear Physics*, **B149**, 413 (1979) and erratum **B157**, 543 (1979).

53. Fox, G. C. and Wolfram, S., "Tests for Planar Events in e^+e^- Event Shapes," (with S. Wolfram), *Physics Letters*, **82B**, 134 (1979).

54. Fox, G. C. and Wolfram, S., "A Gallimaufry of e^+e^- Event Shapes," Caltech preprint CALT-68-723 (1979), unpublished.

55. Fox, G. C. with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana University, "Jets Produced in π^-, π^+ and Proton Interactions at 200 GeV on Hydrogen and Aluminium Targets," *Phys. Rev. Letters*, **42**, 1202 (1979) and erratum ibid. **43**, 1057 (1979).

56. Fox, G. C. with P. R. Stevens, Particle Data Group and High Energy Physics Laboratory representatives, "An indexed Compilation of Experimental High Energy Physics Literature," LBL-90 (1978).

57. Fox, G. C. with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana), "Production and Correlations of Charged Particles with High $p_\perp$ in 200 GeV$\pi^\pm p$, $K^- p$ and pp Collisions," *Phys. Rev. Letters*, **43**, 561 (1979).

58. Fox, G. C. with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana), "Experimental Tests of Quantum Chromodynamics in High $p_\perp$ Jet Production in 200 GeV/c Hadron-Proton Collisions," *Phys. Rev. Letters*, **43**, 565 (1979) and erratum ibid. **43**, 1058 (1979).

59. Fox, G. C. with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana), "Measurement of Forward Jets Produced in High Transverse Momentum Hadron-Proton Collisions," *Phys. Rev. Letters*, **45**, 769 (1980).

60. Fox, G. C. with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana), "Jet Production in High-Energy Hadron-Proton Collisions," *Nuclear Physics*, **B171**, 38 (1980).

61. Fox, G. C. with experimental groups at Caltech, UCLA, Chicago Circle, Fermilab and Indiana, "Structure of Events in 200 GeV Interactions on Hydrogen and Aluminium Targets in Both Soft and Hard Collisions," *Nuclear Physics*, **B171**, 38 (1980).

62. Fox, G. C. and Farrar, G., "QCD Calculation of the Leading Particle Contribution to High $p_\perp$ π^0 Production in πp Collisions," *Nuclear Physics*, **B167**, 205 (1980).

63. Fox, G. C., Kennett R. G., Stone A. E. A., Barnes A. V., Walker, R. L., Dahl, O. I., Kenney, R. W., Ogawa, A, Pripstein, M, "A Compilation of Cross-Sections for Inclusive π^0 and η Production in the Triple Regge Region at an Incident Momentum of 100 GeV," Caltech preprint CALT-68-698, unpublished (1980).

64. Fox, G. C., Kennett R. G., Stone A. E. A., Barnes A. V., Walker, R. L., Dahl, O. I., Kenney, R. W., Ogawa, A, Pripstein, M, "Inclusive π^0 and η Production from Kaon, Proton and Antiproton Beams in the Triple Regge Region," *Nuclear Physics*, **B177**, 1 (1981).

65. Fox, G. C., Tse, T.-Y., Wolfram, S., "Event Shapes in Deep Inelastic Lepton-Hadron Scattering," *Nuclear Physics*, **B165**, 80 (1980).

66. Fox, G. C., Wolfram, S., "Two and Three-Point Energy Correlations in Hadronic e^+e^- Annihilation," *Zeitschrift fur Physik*, **4C**, 237 (1980).

67. Fox, G. C. with experimental groups at Caltech, Chicago Circle, Fermilab and Indiana, "D and E Mesons and Possible KKK Enhancements," paper presented at the Sixth Conference on Experimental Meson Spectroscopy, Upton, New York, April 25–26, 1980.

68. Fox, G. C. with experimental groups at Caltech, Chicago Circle, Fermilab and Indiana, "Observations of the D and E Mesons and Possible Three Kaon Enhancement in $\pi^- p \to K^0 K^\pm \pi^\pm X$, $K^0 K^+ K^- X$ at 50 GeV/c and 100 GeV/c," *Phys. Rev.*, **D22**, 1513 (1980).

69. Fox, G. C. and Wolfram S., "A Model for Parton Showers in QCD," *Nuclear Physics*, **B168**, 285 (1980).

70. Fox, G. C. and Romans L., "A Longer Note on Top Quarks," Fermilab Colliding Beam Detector Facility Note CDF-70 (1980), unpublished.

71. Fox, G. C., "Untangling Jets from Hadronic Final States," lectures given at the 1981 SLAC Summer School, Proceedings of the SLAC Summer School, August, 1981; Caltech preprint, CALT-68-863.

72. Fox, G. C., Gupta, R., Martin, O., and Otto, S., "Monte Carlo Estimates of the Mass Gap of the 0(2) and 0(3) Spin Models in $1+1$ Dimensions," *Nuclear Physics*, **B205**, 188 (l982).

73. Fox, G. C., (with Particle Data Group), "Compilation of High Energy Physics Data: Inventory of the Particle Data Group Holdings 1980," LBL-92, CALT-68- 821, unpublished preprint, (December, 1980).

74. Fox, G. C., Cole, C. A., Wolfram, S., Greif, J. M., Mjolsness, E. D., Romans, L. J., Shaw, T., and Terrano, A. E. "SMP: A Symbolic Manipulation Program."

75. Fox, G. C., Kelly, R. L., "Gluon Bremstrahlung Effects in Large $p_\perp$ Hadron-Hadron Scatterings," in *Proton-Antiproton Collider Physics—l981*, AIP Conference proceedings number 85 edited by V. Barger, D. Cline and F. Helzen (AIP, l982).

76. Fox, G. C., Field, R. D., and Kelly, R. L., "Gluon Bremstrahlung Effects in Hadron-Hadron Collisions," *Physics Letters*, **119B**, 439 (1982).

77. Fox, G. C. and Field, R. D., "QCD Monte Carlo Models for e^+e^- Annihilations and Hadron-Hadron Collisions", Invited talk at Europhysics Study Conference on *Jet Dynamics in Quark and Lepton Interactions*, Erice, September, 1982.

78. Fox, G. C., (with experimental groups at Caltech, Fermilab, Chicago Circle and Indiana), "A Study of A_2 Production in the Reaction $\pi^- p \to K^0 K^- p$ at 50, 100 and 175 GeV," *Phys. Rev.*, **D27**, 1 (1983).

79. Fox, G. C., (with experimental groups at Caltech, Fermilab, Chicago Circle and Indiana), "A Study of the Reaction $\pi^- p \to \pi^- \pi^+ n$ at l00 and 175 GeV/c" *Nuclear Physics*, **B232**, 189 (1984).

80. Fox, G. C., (with experimental groups at Caltech, Fermilab, Chicago Circle and Indiana), "Highlights of the Reaction $\pi^- p \to \pi^- \pi^+ n$ at l00 and 175 GeV/c," *Phys Rev.*, **D29**, 588 (1984).

81. Fox, G. C., (with experimental groups at Caltech, Fermilab, Chicago Circle and Indiana), "Numerical Tables of Measurements from Fermilab Experiment E110 for the Reactions $\pi^- p \to \pi^- \pi^+ n$ and $\pi^- p \to A_2^- p$," CALT-68-952 unpublished memo (1982).

82. Fox, G. C., (with experimental groups from Caltech, U.C. Davis, U.C. San Diego, Carleton, LBL, Michigan State), "An SU(3)-Based Comparison Between Inclusive Kaon and Pion Charge Exchange Scattering in the Triple Regge Region," *Nuclear Physics*, **B206**, 173 (1982).

83. Fox, G. C., (with experimental groups from Caltech, U.C. Davis, U.C. San Diego, Carleton, LBL, Michigan State), "A Compilation of Cross-Sections for Inclusive Kaon and Pion Charge Exchange," CALT-68-895 unpublished memo (1982).

84. Fox, G. C., Brooks, E., Otto, S., Randeria, M., Athas, W., DeBenedictis, E., Newton, M., and Seitz C., "Glueball Mass Calculations on an Array of Computers," *Nuclear Physics*, **B220**, 383 (1983).

85. Fox, G. C., "Use of IBM Personal Computers in the Caltech Physics Department", October 1983 in *Proceedings of 8th IBM University Study Conference.*

86. Fox, G. C., "Scientific Calculations with Ensemble Computers," Invited talk at the three day in-depth review on the *Impact of Specialized Processors in Elementary Particle Physics.* (University of Padua, 1983), Caltech report C3P-37.

87. Fox, G. C., (with experimental groups at Caltech, Fermilab, Chicago Circle, and Indiana), "Production of the $K^0K^{\pm}\pi^{\mp}$ system in π^-p and K^-p interactions at 50, 100, and 175 GeV/c," *Phys. Rev.*, **D30**, 2411 (1984).

88. Fox, G. C., "Concurrent Processing for Scientific Calculations," proceedings of the *COMPCON '84 28th IEEE Computer Society International Conference*, page 70, February 27–March 1, 1984, Caltech report C3P-48.

89. Fox, G. C., Brooks, E., Johnson, M., Otto, S., Stolorz, P., Athas, W., DeBenedictis, E., Faucette, R., Seitz, C., and Stack, J., "Pure Gauge SU(3) Lattice Theory on an Array of Computers," *Phys. Rev. Letters*, **52**, 2324 (1984), Caltech report C3P-65.

90. Fox, G. C. and Otto, S., "Algorithms for Concurrent Processors," *Physics Today*, May 1984. Translated into Japanese in *Nikkei Electronics*, July, 1985, Caltech report C3P-71.

91. Fox, G. C., "Use of IBM-PC's in Physics Education at Caltech," December 1984 in *Proceedings of 9th IBM University Study Conference.*

92. Fox, G. C., "Are Concurrent Processors General Purpose Computers?," *Proceedings of IEEE Nuclear Science Symposium*, October 31, 1984. Published in February 1985 issue of *IEEE Transactions of N.P.S.S.*, Vol. 34, Caltech report C3P-122.

93. Fox, G. C., "The Performance of the Caltech Hypercube in Scientific Calculations—a Preliminary Analysis," in *Supercomputers-Algorithms, Architectures, and Scientific Computation*, edited by F. A. Matsen and T. Tajima, University of Texas Press (1987), Caltech report C3P-161.

94. Fox, G. C., Lyzenga, G., Rogstad, D. and Otto, S., "The Caltech Concurrent Computation Program," published in *Proceedings of Computers in Engineering Conference*, August 4-8, Boston 1985, Caltech report C3P-157.

95. Fox, G. C., "Using the Caltech Hypercube," *IEEE Software*, July 1985, Caltech report C3P-162.

96. Fox, G. C. and Otto, S., "The Caltech Concurrent Computation Program—A Status Report," published in a theme issue on supercomputing in the magazine *Computers in Mechanical Engineering*, published by ASME and Springer Verlag, March 1986, Caltech report C3P-157b.

97. Fox, G. C., Hey, A. and Otto, S., "Matrix Algorithms on the Hypercube I: Matrix Multiplication," *Parallel Computing*, 4, 17 (1987), Caltech report C3P-206.

98. Fox, G. C., Otto, S. and Umland, E., "Monte Carlo Physics on a Concurrent Processor," published in the *Proceedings of Frontiers of Quantum Monte Carlo Conference* at Los Alamos, September 6, 1985—published in special issue of *Journal of Statistical Physics*, Vol. 43, 1209, Plenum Press, 1986, Caltech report C3P-214.

99. Fox, G. C. and Otto, S., "Concurrent Computation and the Theory of Complex Systems", *Hypercube Multiprocessors*, 1986, edited by M. T. Heath, SIAM (1986) 244, Caltech report C3P-255.

100. Fox, G. C., Kennett, R. G., Barnes, A. V., Walker, R. L. Dahl, O. I., Keeney, R. W. Ogawa, A. and Propstein, M., "The Production of Neutral Pions from 200 GeV $\pi^- p$ Collisions in the High X-Region." CALT-68-1367; *Nucl. Phys.*, **B284**:(3–4), 653–673 (1987).

101. Fox. G. C., "Questions and Unexpected Answers in Concurrent Computation", CALT-68-1403, June 16, 1986. Published by the North-Holland in *Experimental Parallel Computing Architectures*. (Jack Dongarra, Editor), Caltech report C3P-288.

102. Fox, G. C., "Caltech Concurrent Computation Program Annual Report for 1985-86", CALT- 68-1404, October 13, 1986, published in *Hypercube Multiprocessors*, 1987, edited by M. T. Heath, SIAM (1987) 353, Caltech report C3P-290b.

103. Fox, G. C, "A Graphical Approach to Load Balancing and Sparse Matrix Vector Multiplication on the Hypercube", CALT-68-1406, July 22, 1986. The *Proceedings for the Workshop on Numerical Algorithms for Modern Parallel Computer Architectures*, held at the IMA in November 1985, published as Volume 13 in the IMA Volumes in Mathematics and Its Applications, Numerical Algorithms for Modern Parallel Computer Architectures, (Springer-Verlag), New York, Caltech report C3P-327b.

104. Fox, G. C. and Furmanski, W., "Communication Algorithms for Regular Convolutions on the Hypercube", *Hypercube Multiprocessors*, 1987, edited by M. T. Heath, SIAM (1987) 233, Caltech report C3P-329.

105. Fox, G. C., Ho, A., Walker, D. and Montry G. (Sandia), "A Comparison of the Performance of the Caltech Mark II Hypercube and the Elxsi 6400", *Hypercube Multiprocessors*, 1987, edited by M. T. Heath, SIAM (1987), 210, Caltech report C3P-356.

106. Fox, G. C., "A Review of Automatic Load Balancing and Decomposition Methods for the Hypercube", November 1986. The *Proceedings for the Workshop on Numerical Algorithms for Modern Parallel Computer Architectures*, held at the IMA in November 1985, published as Volume 13 in the IMA Volumes in Mathematics and Its Applications, Numerical Algorithms for Modern Parallel Computer Architectures, (Springer-Verlag), New York, Caltech report C3P-385.

107. Fox, G. C., "The Hypercube as a Supercomputer", January 7, 1987. Presented at the *Second International Conference on Supercomputing* at Santa Clara, May 1987. Published by the International Supercomputing Institute, Inc., St. Petersburg, Florida, May 1987, Caltech report C3P-391.

108. Fox, G. C., "Domain Decomposition in Distributed and Shared Memory Environment—I: A Uniform Decomposition and Performance Analysis for the NCUBE and JPL Mark II-Ifp Hypercubes," *Supercomputing*, June 8–12, 87, Athens, Greece. Published in *Lecture Notes in Computer Science*, edited by E. N. Houstis, T. S. Papatheodorou, and C. D. Polychronopoulos, Springer-Verlag (1987), Vol. 297, 1042–1073, Caltech report C3P-392.

109. Fox. G. C., "The Hypercube and the Caltech Concurrent Computation Program, A Microcosm of Parallel Computing," *Special Purpose Computers*, edited by B. J. Alder, Academic Press, Inc. (1988), 1–40, Caltech report C3P-422.

110. Fox, G. C., Kim, J. S. Aloisio, G. and Veneziani N. "A Concurrent Implementation of the Prime Factor Algorithm on Hypercube," September 1987. Caltech report C3P-468.

111. Fox, G. C., Furmanski, W., "The Physical Structure of Concurrent Problems and Concurrent Computers," *Phil. Trans. R. Soc. Lond. A*, **326**, 411–444 (1988). Also published in *Scientific Applications of Multiprocessors*, edited by R. J. Elliott and C. A. R. Hoare, Prentice Hall (1988), 55–88. Caltech report C3P-493.

112. Fox, G. C., Walker, D., "A Portable Programming Environment for Multiprocessors," in the *Proceedings of the 12th IMACS World Congress on Scientific Computing*, July 18–22, 1988, Paris, France. Caltech report C3P-496.

113. Fox, G. C. and Kolawa, A., "Use of the Hypercube for Symbolic Quantum Chromodynamics," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 1408–1419, Caltech report C3P-182c.

114. Fox, G. C. and Furmanski W. "Optimal Communication Algorithms for Regular Decompositions on the Hypercube," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 648–713, Caltech report C3P-314b.

115. Fox, G. C., Cisneros, T., Furmanski, W., and Walker, D. W., "LU Decomposition of Banded Matrices and the Solution of Linear Systems on Hypercubes," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 1635–1655, Caltech report C3P-348b.

116. Fox, G. C. and Furmanski, W. "Load Balancing Loosely Synchronous Problems with a Neural Network," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 241–278, Caltech report C3P-363b.

117. Fox, G. C. and Walker, D. "Optimal Matrix Algorithms on Homogeneous Hypercubes," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 1656–1673, Caltech report C3P-386b.

118. Fox. G. C., Bhalla, U., Furmanski, W., Nelson, M. Wilson, M., and Bower, J. "Structural Simulations of Neural Networks Using a General-Purpose Neural Network Simulator and a Hypercube Concurrent Computer," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 977–999, Caltech report C3P-404b.

119. Fox, G. C. and Furmanski, W. "Hypercube Algorithms for Neural Network Simulation—The Crystal_Accumulator and the Crystal_Router," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 714–724, Caltech report C3P-405b.

120. Walker, D. W., Fox, G. C. and Montry, G. R., "The Flux-Corrected Transport Algorithm on the NCUBE Hypercube," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 1117–1126, Caltech report C3P-495.

121. Fox, G. C. and Furmanski, W., "A String Theory of Automatic Decomposition," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 285–305, Caltech report C3P-521.

122. Fox, G. C., "What Have We Learnt from Using Real Parallel Machines to Solve Real Problems," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 897–955, Caltech report C3P-522.

123. Fox, G. C. and Frey, A., "Problems and Approaches for a Teraflop Processor," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 21–25, Caltech report C3P-606.

124. Fox, G. and Furmanski, W. "Integrated Vision on a Network of Computers," Invited paper at *Fourth International Symposium on Biological and Artificial Intelligence Systems*, published in *Biological and Artificial Intelligence Systems*, ESCOM Science Publishers, Caltech report C3P-623 (1988).

125. Fox, G. C., and Messina, P., "Advanced Computer Architectures," *Scientific American*, **255**/10, (October 1987), Caltech report C3P-476.

126. Gupta, R., DeLapp, J., Batrouni, G., Fox, G., Baillie, C., and Apostolakis, J., "The phase transition in the 2-d XY model," *Phys. Rev. Lett.*, **61**, 1996 (1988), Caltech report C3P-643.

127. Fox, G. C., "Issues in Software Development for Concurrent Computers," in the *Proceedings of the Twelfth Annual International Computer Software and Applications Conference*, edited by G. J. Knafl, Computer Society Press of the IEEE (1988), 302–305, Caltech report C3P-640.

128. Fox, G. C., and Walker, D., "Concurrent Supercomputers in Science," in *Proceedings of the Conference on Computers in Physics Instruction*, Edward F. Redish and John S. Risley (eds.), Addison-Wesley (1989), 346–361. Conference held in Raleigh, North Carolina, August 1–5, 1988. Caltech Technical Report C3P-646.

129. Fox, G. C., and Koller, J., "Code Generation by a Generalized Neural Network: General Principles and Elementary Examples," *Journal of Parallel and Distributed Computing*, **6**, 388–410 (1989), Caltech report C3P-650b.

130. Fox, G. C., "Theory and Practice of Concurrent Systems," in *Proceedings of International Conference on Fifth Generation Computer Systems*, ICOT (November 1988), 157–160, Caltech report C3P-664.

131. Fox, G. C., Furmanski, W., and Koller, J., "The Use of Neural Networks in Parallel Software Systems," in *Mathematics and Computers in Simulation*, **31**/6, 485–495 (1989), Caltech report C3P-642b.

132. Ho, A., Fox, G. C., Snyder, S., Chu, D., and Mylner, T., "Three-Dimensional Asteroids Using Parallel Graphics on nCUBE: A Testbed for Evaluating Controller Algorithms," in the *Proceedings of the Fourth Conference on Hypercubes, Concurrent Computers and Applications*, John L. Gustafson (ed.), Golden Gate Enterprises, Los Altos, CA (March, 1989), 1177. Caltech Technical Report C3P-681b.

133. Fox, G., Furmanski, W., Ho, A., Koller, J., Simic, P., and Wong, Y., "Neural Networks and Dynamic Complex Systems," in *1989 SCS Eastern Conference* held in Tampa, Florida, March 28–31, 1989. Caltech report C3P-695.

134. Koller, J., Fox, G. C., and Furmanski, W., "Physical Optimization and Dynamic Load Balancing," Caltech report C3P-670 (1988).

135. Fox, G. C., "1989—The First Year of the Parallel Supercomputer," in the *Proceedings of the Fourth Conference on Hypercubes, Concurrent Computers and Applications*, John L. Gustafson (ed.), Golden Gate Enterprises, Los Altos, CA (March 1989), 1. Caltech Technical Report C3P-769.

136. Fox, G. C., "Parallel Computing Comes of Age: Supercomputer Level Parallel Computations at Caltech," *Concurrency: Practice and Experience*, **1**/1, 63–103, John Wiley and Sons, Ltd. (1989). Caltech report C3P-795.

137. Fox, G., Hipes, P., and Salmon, J., "Practical Parallel Supercomputing: Examples from Chemistry and Physics," in *Proceedings of Supercomputing '89*, ACM Press (1989), 58–70. Caltech report C3P-818.

138. Aloisio, G., Lopinto, E., and Fox, G. C., "A Method to Reduce the Inter-node Communications for a Concurrent Implementation of the Prime Factor Algorithm", in the *Proceedings of the Fourth Conference on Hypercubes, Concurrent Computers and Applications*, John L. Gustafson (ed.), Golden Gate Enterprises, Los Altos, CA (March 1989), 1079. Caltech Technical Report C3P-773.

139. Aloisio, G. Veneziani, N., Fox, G., and Milillo, G., "Computational Load Evaluation for the Real-Time Compression of X-SAR Raw Data", *Space Technology*, **10**(4), 189-199, November 1990. Caltech Technical Report C3P-740b.

140. Baillie, C. F., and Fox, G. C., "Parallel Computing Comes of Age: Supercomputer Calculations for Lattice QCD and Spin Models on Advanced Architecture Computers", in *High Performance Computing*, J.-L. Delhaye and E. Gelenbe (eds.), Elsevier Science Publishers, North-Holland, Amsterdam (1990). European Symposium held in Montpellier, France, March 22–24, 1989. Caltech Technical Report C3P-711.

141. Ding, H.-Q., Baillie, C. F., and Fox, G. C., "Calculation of the Heavy Quark Potential at Large Separation on a Hypercube Parallel Computer," *Phys. Rev.*, **D41**(9), 2912–2916 (May 1990). Caltech report C3P-779b.

142. Aloisio, G., Veneziani, N., Kim, J., and Fox, G., "The Prime Factor Non-binary Discrete Fourier Transform and use of Crystal_Router as a General Purpose Communication Routine," *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 1322–1327. Caltech report C3P-523.

143. Liewer, P., Decyk, V., Dawson, J., and Fox, G., "A Universal Concurrent Algorithm for Plasma Particle-in-Cell Simulation Codes," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 2, edited by G. C. Fox, ACM Press (1988), 1101–1107. Caltech report C3P-562.

144. Ho, A. Fox, G., Walker, D., Breaden, W., Chen, S., Knutson, A., and Kuwamato, S., "MAC-CUBE, the Macintosh-Based Hypercube," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 98–103. Caltech report C3P-573.

145. Ho, A., Fox, G., Walker, D., Snyder, S., Chang, D., Chen, S., Breaden, M., and Cole, T., "PC-CUBE, A Personal Computer Based Hypercube," in *Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications*, Volume 1, edited by G. C. Fox, ACM Press (1988), 92–97. Caltech report C3P-587.

146. Fox, G., Ho, A., Messina, P., and Cole, T., "Hands-on Parallel Processing," *BYTE*, **14**/10, 287–293, McGraw-Hill, Inc. (1989). Caltech report C3P-828.

147. Kennett, R., Barnes, A., Fox, G., Walker, R., Dahl, O., Kenney, R., Ogawa, A., and Pripstein, M., "The Production of Neutral Pions from 200 GeV $\pi^- p$ Collisions in the High x Region," *Nuclear Physics*, **B284**, North-Holland (1987) 653–673.

148. Furmanski, W., and Fox, G. C., "MOVIE—a software environment for modeling complex adaptive systems." Technical Report C3P-838, California Institute of Technology, Pasadena, CA, October 1989. Presented at SPIE Conference, Philadelphia, 1989. Syracuse University Technical Report SCCS-539.

Reports and Papers Prepared at Syracuse University (1990–1996)

1. Balasundaram, V., Fox, G., Kennedy, K., and Kremer, U. "Static performance estimation in a data partitioning tool," in *Third ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*. ACM, April 1990. Held in Williamsburgh, Virginia. SCCS-14b. [Balasundaram:90i]

2. Fox, G. C. "Applications of parallel supercomputers: scientific results and computer science lessons," in M. A. Arbib and J. A. Robinson, editors, *Natural and Artificial Parallel Computation*, Chapter 4, pages 47–90. MIT Press, Cambridge, MA, 1990. Invited presentation at the Inaugural Symposium for the Center for Science and Technology, Syracuse, New York. SCCS-23. Caltech Report C3P-806b. [Fox:90o]

3. Fox, G. C. "Hardware and software architectures for irregular problem architectures," in P. Mehrotra, J. Saltz, and R. Voigt, editors, *Unstructured Scientific Computation on Scalable Microprocessors*, pages 125–160. The MIT Press, Cambridge, MA, 1992. Scientific and Engineering Computation Series. Held by ICASE in Nags Head, North Carolina. SCCS-111; CRPC-TR91164. [Fox:90p]

4. Gandhi, A., and Fox, G. C. "Solving problems in navigation." Technical Report SCCS-9, Syracuse University, NPAC, Syracuse, NY, 1990. Unpublished. [Gandhi:90a]

5. Keppenne, G. L., Ghil, M., Fox, G. C., Flower, J. W., Kolawa, A., Papaccio, P. N., Rosati, J. J., Shepanski, J. F., Spadaro, F. G., and Dickey, J. O. "Parallel processing applied to climate modeling," *TRW Quest Magazine*, 13(2):54–64, 1990/1991. SCCS-22b. [Keppenne:90b]

6. Rose, K., Gurewitz, E., and Fox, G. C. "Statistical mechanics and phase transitions in clustering," *Physical Review Letters*, 65(8):945–948, August 1990. SCCS-20. Caltech Report C3P-893. [Rose:90c]

7. Wu, M.-Y., and Fox, G. C. "Test suite and performance for Fortran90 compilers." Technical Report SCCS-40, Syracuse Center for Computational Science, Syracuse, NY, 1990. [Wu:90b]

8. Wu, M.-Y., and Fox, G. C. "An outline of Fortran90 compiler for distributed memory systems." Technical Report SCCS-41, Syracuse Center for Computational Science, Syracuse, NY, 1990. [Wu:90c]

9. Apostolakis, J., Baillie, C., and Fox, G. C. "Investigation of the two-dimensional O(3) model using the overrelaxation algorithm," *Physical Review D*, 43(8):2687–2693, April 1991. COLO-HEP-231, CRPC-TR90078, SCCS-65. Caltech Report C3P-943b. [Apostolakis:91a]

10. Apostolakis, J., Baillie, C. F., and Fox, G. C. "The 2-d O(3) model by overrelaxation," *Nuclear Physics B (Proc. Suppl)*, 20:678, 1991; SCCS-101. [Apostolakis:91b]

11. Fox, G. C. "FortranD as a portable software system for parallel computers," in *Proceedings of Supercomputing USA/Pacific 91*, pages 82–91, 1991. Held in Santa Clara, California. Syracuse University, NPAC Technical Report SCCS-91; CRPC–TR91128. [Fox:91d]

12. Fox, G. C., Hiranandani, S., Kennedy, K., Koelbel, C., Kremer, U., Tseng, C.-W., and Wu, M.-Y. "Fortran D language specification." Technical Report SCCS-42c, Syracuse University, Syracuse, NY, April 1991. CRPC-TR90079. [Fox:91e]

13. Fox, G. C., "Achievements and prospects for parallel computing", *Concurrency: Practice and Experience*, 3(6):725–739, December 1991. Special Issue: Practical Parallel Computing: Status and Prospects. Guest Editors: Paul Messina and Almerico Murli. SCCS-29b, C3P-927b, CRPC-TR90083. Invited talk at *International Conference on Parallel Computing: Achievements, Problems and Prospects*, Anacapri, Italy, June 3–9, 1990. [Fox:91f]

14. Fox, G. C. "The architecture of problems and portable parallel software systems." Technical Report SCCS-134, Syracuse University, NPAC, Syracuse, NY, July 1991. Revised SCCS-78b. [Fox:91g]

15. Fox, G. C., and Mansour, N. "An evolutionary approach to load balancing parallel computations," in *Proceedings of Sixth Distributed Memory Computing Conference*, pages 200–203. IEEE Computer Society Press, May 1991. SCCS-25b. [Fox:91l]

16. Fox, G. C. "Physical computation," *Concurrency: Practice and Experience*, 3(6):627–653, December 1991. Special Issue: Practical Parallel Computing: Status and Prospects. Guest Editors: Paul Messina and Almerico Murli. SCCS-2b, C3P-928b, CRPC-TR90090. [Fox:91j]

17. Fox, G. C. "Lessons from massively parallel architectures on message passing computers," in *The 37th Annual IEEE International Computer Conference, COMPCON '92*. IEEE Computer Society Press, Los Alamitos, CA, December 1991. Held February 24–28, 1992 in San Francisco, California. CRPC-TR91192; SCCS-214. [Fox:91m]

18. Mansour, N., and Fox, G. "Physical optimization methods for allocating data to multicomputer nodes," in *Proceedings of System Design Synthesis Technology Workshop*, pages 169–182, September 1991. Naval Surface Warfare Center, Silver Spring, MD. SCCS-122. [Mansour:91d]

19. Moore, A., Fox, G. C., Allman, J., and Goodman, R. "A VLSI neural network for color constancy," in D. S. Touretzky and R. Lippman, editors, *Advances in Neural Information Processing Systems 3*. Morgan Kaufmann, San Mateo, CA, 1991. SCCS-48. Caltech Report C3P-956. [Moore:91a]

20. Wu, M., Fox, G. C., and Shu, W. "DO and FORALL: Temporal and spatial control structures." Technical Report SCCS-139, Syracuse University, NPAC, Syracuse, NY, 1991. CRPC-TR91189. [Wu:91e]

21. Ahmad, I., Choudhary, A., Fox, G., Parasuram, K., Ponnusamy, R., Ranka, S., and Thakur, R. "Implementation and scalability of Fortran 90D intrinsic functions on distributed memory machines." Technical Report SCCS-256, Syracuse University, NPAC, Syracuse, NY, March 1992. [Ahmad:92a]

22. Ahmad, I., Ghafoor, A., and Fox, G. "Allocation of computations with dynamic structures on hypercube based distributed systems," in *Proceedings of the 1st International Symposium on High-Performance Distributed Computing*, pages 228–237. IEEE Computer Society Press, 1992. SCCS-221c. [Ahmad:92b]

23. Bozkus, Z., Ranka, S., and Fox, G. "Benchmarking the CM-5 multicomputer," in *Frontiers of Massively Parallel Computation*. Syracuse University, NPAC Technical Report SCCS-257, March 1992. [Bozkus:92a]

24. Cheng, G., Faigle, C., Fox, G. C., Furmanski, W., Li, B., and Mills, K. "Exploring AVS for HPDC software integration: Case studies towards parallel support for GIS." Technical Report SCCS-473, Syracuse University, NPAC, Syracuse, NY, March 1992. Paper presented at the 2nd Annual International AVS Conference *The Magic of Science: AVS '93*, Lake Buena Vista, Florida, May 24–26, 1993. [Cheng:92a]

25. Choudhary, A., Fox, G. C., Ranka, S., Hiranandani, S., Kennedy, K., Koelbel, C., and Tseng, C. "Compiling Fortran 77D and 90D for MIMD distributed-memory machines," in *Proceedings of the Fourth Symposium on the Frontiers of Massively Parallel Computation: Frontiers '92*, pages 4–11. IEEE Computer Society Press, Los Alamitos, CA, October 1992. Syracuse University, NPAC Technical Report SCCS-251. CRPC-TR92203. [Choudhary:92c]

26. Choudhary, A., Fox, G., Hiranandani, S., Kennedy, K., Koelbel, C., Ranka, S., and Saltz, J. "A classification of irregular loosely synchronous problems and their support in scalable parallel software systems," in *DARPA Software Technology Conference 1992 Proceedings*, pages 138–149, April 1992. Syracuse Technical Report SCCS-255. [Choudhary:92d]

27. Choudhary, A., Fox, G., Ranka, S., Hiranandani, S., Kennedy, K., Koelbel, C., and Saltz, J. "Software support for irregular and loosely synchronous problems," *Computing Systems in Engineering*, 3(1–4):43–52, 1992. CSE-MS 118, SCCS-297b, CRPC-TR92258. [Choudhary:92e]

28. Choudhary, A., Fox, G., Haupt, T., and Ranka, S. "Which applications can use high performance Fortran and FortranD—industry standard data parallel languages?," in *Proceedings of Fifth Australian Supercomputing Conference*, World Congress Centre, Melbourne, Australia, 117–124, December 1992. SCCS-360, CRPC-TR92264. [Choudhary:92g]

29. Chrisochoides, N., Droegemeir, K., Fox, G., and Mills, K. "A methodology for developing high performance computing models: Storm-scale weather prediction." Technical Report SCCS-402, Syracuse University, NPAC, Syracuse, NY, December 1992. [Chrisochoides:92b]

30. Fox, G., Choudhary, A., Ranka, S., Kennedy, K., and Koelbel, C., "FortranD: Scalable and Portable Software Modules for SIMD and MIMD Distributed Memory Parallel Computers," Published-Presentation No. 4., DARPA HPC High Performance Software PI Meeting, San Diego, CA, January 15-17, 1992.

31. Fox, G. C. "The use of physics concepts in computation," in B. A. Huberman, editor, *Computation: The Micro and the Macro View*, Chapter 3, 103–154. World Scientific Publishing Co. Ltd., 1992. SCCS-237, CRPC-TR92198. Caltech Report C3P-974. [Fox:92c]

32. Fox, G. C. "Parallel computing and education," *Daedalus Journal of the American Academy of Arts and Sciences*, 121(1):111–118, 1992. CRPC-TR91123, SCCS-83. Caltech Report C3P-958. [Fox:92d]

33. Fox, G. C. "Parallel computing in industry—an initial survey," in *Proceedings of Fifth Australian Supercomputing Conference (supplement)*, pages 1–10. Communications Services, Melbourne, December 1992. Held at World Congress Centre, Melbourne, Australia. Syracuse University Technical Report SCCS-302b. CRPC-TR92219. [Fox:92e]

34. Fox, G. C. "Approaches to physical optimization," in *Proceedings of 5th SIAM Conference on Parallel Processes for Scientific Computation*, J. Dongarra, K. Kennedy, P. Messina, D. Sorensen, and R. Voight, editors, SIAM, pages 153–162, 1992. SCCS-92, CRPC-TR91124. Caltech Report C3P-959. [Fox:92i]

35. Fox, G. C., Mohamed, G. A., von Laszewski, G., and Parashar, M. "On the parallelization of blocked LU factorization algorithms for distributed memory architectures," in *Supercomputing '92*, pages 170–179. IEEE Computer Society Press, Inc., Minneapolis, MN, November 1992. CRPC-TR92210. SCCS-271c. [Fox:92j]

36. Fox, G. C., and Balasundaram, V. "Parallel programming as an optimization problem," in *Expert Systems for Scientific Computing*, E. N. Houstis, J. R. Rice, and R. Vichnovetsky, editors, pages 125–156. Elsevier Science Publishers B.V., North-Holland, Amsterdam, 1992. Invited talk given at Second International Conference on Expert Systems for Scientific Computing, Purdue University, April 24, 1990. SCCS-110, CRPC-TR90161. Caltech Report C3P-891. [Fox:92k]

37. Fox, G. C. "Fox explores prospects for parallel computing," printed article in *Chemical Design Automation News*, 7(6), 14–22. Technical Report SCCS-265b, Syracuse University, NPAC, Syracuse, NY, June 1992. [Fox:92m]

38. Fox, G., Mohamed, G., von Laszewski, G., Parashar, M., Lin, N., and Yeh, N. "High performance scalable matrix algebra algorithms for distributed memory architectures." Technical Report SCCS-271, Syracuse University, NPAC, Syracuse, NY, April 1992. [Fox:92n]

39. Hiranandani, S., Kennedy, K., Koelbel, C., Choudhary, A., Fox, G., Ranka, S., and Saltz, J. "A classification of irregular loosely synchronous problems and their support in scalable parallel software systems." Technical Report SCCS-291, Syracuse University, NPAC, Syracuse, NY, April 1992. [Hiranandani:92b]

40. Kennedy, K., Koelbel, C., Hiranandani, S., Fox, G., Choudhary, A., Haupt, T., Ranka, S., Bordawekar, R., Bozkus, Z., Thakur, R., and Wang, J. "Extended high performance Fortran: Fortran90D." Technical Report SCCS-422, Syracuse University, NPAC, Syracuse, NY, November 1992. [Kennedy:92a]

41. Li, Y., Wu, M., Shu, W., and Fox, G. "Linear programming algorithms and parallel implementations." Technical Report SCCS-288, Syracuse University, NPAC, Syracuse, NY, May 1992. [Li:92a]

42. Mansour, N., and Fox, G. C., "Allocating data to multicomputer nodes by physical optimization algorithms for loosely synchronous computations," *Concurrency: Practice and Experience*, 4(7):557–574, 1992. SCCS-350, CRPC-TR92262. [Mansour:92a]

43. Mansour, N., and Fox, G. "Parallel genetic algorithms with application to load balancing for parallel computation." Technical Report SCCS-74c, Syracuse University, NPAC, Syracuse, NY, June 1992. Published in *Supercomputing Symposium '92*, Montreal, Quebec, Canada. [Mansour:92b]

44. Mansour, N., and Fox, G. "A comparison of load balancing algorithms for parallel computations," in *Proceedings of Supercomputing Symposium '92*, Montreal, Quebec, Canada, June 1992; SCCS-154b. [Mansour:92c]

45. Mansour, N., and Fox, G. C. "Parallel physical optimization algorithms for data mapping," in *Proceedings of the International Conference on Parallel Processing CONPAR '92*, Lyons, France, June 1992. SCCS-240. [Mansour:92e]

46. Mills, K., Cheng, G., Vinson, M., Ranka, S., and Fox, G. "Software issues and performance of a parallel model for stock option pricing," in *Proceedings of the Fifth Australian Supercomputing Conference*, pages 125–134, December 1992. Held in Melbourne, Australia. SCCS-273b. [Mills:92b]

47. Mills, K., Fox, G. C., and Heimbach, R. "Implementing spatial environmental models on parallel computing systems," *Computers and Geosciences*, 18(8):1047–1054, December 1992. SCCS-150. [Mills:92d]

48. Mills, K., Fox, G., McCracken, N., and Mehrota, A. "A comparison of CM Fortran and C* implementations of a climate modeling application on the Connection Machine-2." Technical Report SCCS-262, Syracuse University, NPAC, Syracuse, NY, March 1992. [Mills:92e]

49. Mills, K., Cheng, G., Vinson, M., Ranka, S., and Fox, G. "Software issues and performance of a stock option pricing model on the Connection Machine-2 and DECmpp-12000." Technical Report SCCS-273, Syracuse University, NPAC, Syracuse, NY, September 1992. [Mills:92f]

50. Mills, K., Cheng, G., Vinson, M., and Fox, G. "Expressing dynamic, asymmetric, two-dimensional arrays for improved performance on the DECmpp-12000." Technical Report SCCS-261, Syracuse University, NPAC, Syracuse, NY, March 1992. [Mills:92g]

51. Mohamed, A. G., Fox, G. C., and von Laszewski, G. "Blocked LU factorization on a multiprocessor computer," *Microcomputers in Civil Engineering*, 8(1):45–56, March 1992. An International Journal from Elsevier Applied Science, ASCE 1991 Engineering Mechanics Conference, Mechanics Computing in the 1990s and Beyond; CRPC-TR92212, SCCS-94b. [Mohamed:92a]

52. Parashar, M., Hariri, S., Mohamed, A., and Fox, G. "A comparative study of blocked LU decomposition on hypercube computers and networked workstations." Technical Report SCCS-295, Syracuse University, NPAC, Syracuse, NY, September 1992. [Parashar:92a]

53. Parashar, M., Hariri, S., Mohamed, A., and Fox, G. "A requirement analysis for high-performance distributed computing over LAN's," in *1st International Symposium on High-Performance Distributed Computing Over LANS*, pages 142–151. IEEE Computer Society Press, September 1992. SCCS-295b. [Parashar:92b]

54. Ponnusamy, R., Thakur, R., Choudhary, A., and Fox, G. "Scheduling regular and irregular communication patterns on the CM-5," in *Proceedings of Supercomputing '92*, IEEE Computer Society Press. CRPC-TR92257; Technical Report SCCS-274, Syracuse University, NPAC, Syracuse, NY, April 1992. [Ponnusamy:92a]

55. Ponnusamy, R., Choudhary, A., and Fox, G. "Communication overhead on CM5: an experimental performance evaluation," in *Proceedings of the Fourth Symposium on the Frontiers of Massively Parallel Computing*, 108–115. CRPC-TR92255. Technical Report SCCS-252, Syracuse University, NPAC, Syracuse, NY, March 1992. [Ponnusamy:92d]

56. Ranka, S., Fox, G., Saltz, J., and Das, R., "Parallelization of CHARMM molecular dynamics code on multicomputers," Preliminary version, September 1992. Technical Report SCCS-236, Syracuse University, NPAC, Syracuse, NY. [Ranka:92a]

57. Ranka, S., Wang, J., and Fox, G. "Static and runtime algorithms for All-to-Many personalized communication on permutation networks." Technical Report SCCS-340, Syracuse University, NPAC, Syracuse, NY, December 1992. [Ranka:92b]

58. Tallent, J., Hyde, E., Findsen, L., Fox, G., and Birge, R. "Molecular dynamics of the primary photochemical event in rhodopsin," in *Journal of the American Chemical Society*, 114(5):1581–1592. Technical Report SCCS-266, Syracuse University, NPAC, Syracuse, NY, March 1992. [Tallent:92a]

59. Wu, M., and Fox, Geoffrey, C. "Fortran 90D compiler for distributed memory MIMD parallel computers." Technical Report SCCS-88c, Syracuse Center for Computational Science, Syracuse, NY, March 1992. [Wu:92a]

60. Wu, M.-Y., and Fox, G. C. "A test suite approach for Fortran90D compilers for MIMD distributed memory parallel computers," in *Proceedings of Scalable High Performance Computing Conference '92*, IEEE Computer Society Press. CRPC-TR92254. Technical Report SCCS-244, Syracuse University, NPAC, Syracuse, NY, April 1992. [Wu:92b]

61. Ahmad, I., Bordawekar, R., Bozkus, Z., Choudhary, A., Fox, G., Parasuram, K., Ponnusamy, R., Ranka, S., and Thakur, R. "Implementation and scalability of Fortran 90D intrinsic functions on distributed memory machines," in *Hawaii International Conference on System Sciences*, January 1993. Syracuse University, NPAC Technical Report SCCS-669; CRPC-TR92256. [Ahmad:93a]

62. Bozkus, Z., Choudhary, A., Fox, G. C., Haupt, T., and Ranka, S. "Fortran 90D/HPF compiler for distributed memory MIMD computers: Design, implementation, and performance results," in *Proceedings of Supercomputing '93*, November, 1993, p. 351. IEEE Computer Society Press. Syracuse University, NPAC Technical Report SCCS-498. [Bozkus:93a]

63. Bozkus, Z., Choudhary, A., Fox, G. C., Haupt, T., and Ranka, S. "A compilation approach for Fortran 90D/HPF compilers on distributed memory MIMD computers," in *Proceedings of the Sixth Annual Workshop on Languages and Compilers for Parallel Computing*. Lecture Notes in Computer Science, Springer-Verlag, pp. 200–215. U. Banerjee, D. Gelernter, A. Nicolau, and D. Padua (editors). Syracuse University, NPAC Technical Report SCCS-499, August 1993. [Bozkus:93c]

64. Bozkus, Z., Choudhary, A., Fox, G., Ranka, S., and Wu, M. "Fortran90D compiler for distributed memory MIMD parallel computers." Technical Report SCCS-432, Syracuse University, NPAC, Syracuse, NY, January 1993. [Bozkus:93d]

65. Bozkus, Z., Choudhary, A., Fox, G., Haupt, T., and Ranka, S. "Compiling HPF for distributed memory MIMD computers," in *Impact of Compilation Technology on Computer Architecture*, pp. 191–217. Kluwer Academic Publishers, David Lilja, and Peter Bard (editors). Syracuse University, NPAC Technical Report SCCS-507, October 1993. [Bozkus:93e]

66. Cheng, G., Mills, K., and Fox, G. "An interactive visualization environment for financial modeling on heterogeneous computing systems," in R. F. Sincovec, editor, *Proceedings of the 6th SIAM Conference on Parallel Processing for Scientific Computing*. SIAM, Norfolk, VA, March 1993. Syracuse University Technical Report SCCS-403. [Cheng:93c]

67. Chien, A., and Fox, G. "High performance computing: Architectures, programming models, current challenges." CRPC tutorial at Urbana Illinois. Technical Report SCCS-574, Syracuse University, NPAC, Syracuse, NY, November 1993. [Chien:93a]

68. Choudhary, A., Fox, G., Hiranandani, S., Kennedy, K., Koelbel, C., Ranka, S., and Tseng, C. "Unified compilation of Fortran 77D and 90D." Technical Report SCCS-570, Syracuse University, NPAC, Syracuse, NY, November 1993. [Choudhary:93a]

69. Chrisochoides, N., fox, G., and Thompson, J. "MENUS-PGG: mapping environment for numerical unstructured and structures—parallel grid generation." Technical Report SCCS-472, Syracuse University, NPAC, Syracuse, NY, March 1993. [Chrisochoides:93b]

70. Coddington, P., Fox, G. C., Han, L., Harris, G., and Marinari, E. "Optimization of a dynamic random surface code for RISC processor." Technical Report SCCS-481, Syracuse University, NPAC, Syracuse, NY, April 1993. [Coddington:93a]

71. Copty, N., Ranka, S., Fox, G., and Shankar, R. "Solving the region growing problem on the Connection Machine," in *Proceedings of the 22nd International Conference on Parallel Processing*, Volume 3, pages 102–105, 1993. Syracuse University, NPAC Technical Report SCCS-397b. [Copty:93a]

72. Faigle, C., Fox, G., Furmanski, W., Niemiec, J., and Simoni, D. "Integrating virtual environments with high performance computing." Technical Report SCCS-586, Syracuse University, NPAC, Syracuse, NY, January 1993. [Faigle:93a]

73. Fox, G. C., and Coddington, P. D. "An overview of high performance computing for the physical sciences," in *Proceedings of Mardi Gras Conference: High Performance Computing and Its Applications in the Physical Sciences.* World Scientific, February 1993. Syracuse University, NPAC Technical Report SCCS-488. [Fox:93a]

74. Fox, G., Bogucz, E., Jones, D., Mills, K., and Podgorny, M. "InfoMall: a scalable organization for the development of HPCC software and systems." Technical Report SCCS-531, Syracuse University, NPAC, Syracuse, NY, September 1993. Unpublished. [Fox:93c]

75. Fox, G. "Parallel computing and education," in N. Metropolis and G. Rota, editors, *A New Era in Computation*, pages 111–118. The MIT Press, Cambridge, MA, 1993. SCCS-83b. [Fox:93d]

76. Fox, G. C., and Coddington, P. "Parallel computers and complex systems," in *Complex Systems: From Biology to Computation*, pages 272–287. Cambridge University Press, 1993. Syracuse University, NPAC Technical Report SCCS-370b. [Fox:93e]

77. Fox, G. C. "Statistics for physicists." Technical Report SCCS-443, Syracuse University, NPAC, Syracuse, NY, April 1993. [Fox:93f]

78. Fox, G. "NYNET issues concerning video on demand and other interactive consumer products." Technical Report SCCS-578 (unpublished), Syracuse University, NPAC, Syracuse, NY, September 1993. [Fox:93h]

79. Fox, G., Furmanski, W., Hornberger, P., Niemiec, J., and Simoni, D. "Towards interactive HPCC: high performance Fortran interpreter." Technical Report SCCS-587, Syracuse University, NPAC, Syracuse, NY, October 1993. [Fox:93i]

80. Fox, G., Impett, R., Leskiw, D., Montry, G., Nicholas, H., Pottle, M., Ranka, S., Salas, M., Salmon, J., Thompkins, T., and Young, J. "Impact of grand challenge applications on HPCC software and tools," in P. Messina and T. Sterleing, editors, *System Software and Tools for High Performance Computing Environments*, chapter 3, pages 25–33. SIAM, Philadelphia, april 1993. Syracuse University Technical Report SCCS-332b. [Fox:93j]

81. Furmanski, W., Faigle, C., Fox, G., Niemiec, J., and Simoni, D. "Integrating virtual environments with high performance computing." Technical Report SCCS-412, Syracuse University, NPAC, Syracuse, NY, January 1993. Paper presented at the 1st IEEE *Virtual Reality Annual International Symposium*, VRAIS '93. [Furmanski:93c]

82. Furmanski, W., Faigle, C., Fox, G. C., Niemiec, J., and Simoni, D. "System requirements for dynamic load balancing in homogeneous platforms for heterogeneous HPDC: Case study using MOVIE." Technical Report SCCS-554, Syracuse University, NPAC, Syracuse, NY, 1993. [Furmanski:93d]

83. Furmanski, W., Faigle, C., Fox, G., Niemiec, J., and Simoni, D. "Supercomputing and VR networking." Technical Report SCCS-555, Syracuse University, NPAC, Syracuse, NY, November 1993. [Furmanski:93g]

84. Hariri, S., and Fox, G. "Trends toward virtual computing environment." Technical Report SCCS-455, Syracuse University, NPAC, Syracuse, NY, March 1993. [Hariri:93b]

85. Hariri, S., Fox, G., Thiagarajan, B., Jadav, D., and Parashar, M. "Parallel software benchmarks for high performance BMC3/IS systems." Technical Report SCCS-490, Syracuse University, NPAC, Syracuse, NY, August 1993. [Hariri:93c]

86. Hariri, S., Park, J., Yu, F., Parashar, M., and Fox, G. "A message passing interface for parallel and distributed computing," in *Proceedings of the Second International Symposium on High Performance Distributed Computing*, pages 84–91. IEEE Computer Society Press, July 1993. Syracuse University, NPAC Technical Report SCCS-522. [Hariri:93d]

87. Mansour, N., Ponnusamy, R., Choudhary, A., and Fox, G. C. "Graph contraction for physical optimization methods: A quality-cost tradeoff for mapping data on parallel computers." Technical Report SCCS-474, Syracuse University, NPAC, Syracuse, NY, March 1993. [Mansour:93b]

88. Mills, K., and Fox, G. C. "HPCC applications development and technology transfer to industry," in I. D. Scherson, editor, *The New Frontiers: A Workshop on Future Directions of Massively Parallel Processing*, pages 58–65, Los Alamitos, CA, October 1993. IEEE Computer Society Press. SCCS-491. [Mills:93a]

89. Parashar, M., Hariri, S., Haupt, T., and Fox, G. "An integrated software development model for heterogeneous high performance computing." Technical Report SCCS-453, Syracuse University, NPAC, Syracuse, NY, January 1993. [Parashar:93a]

90. Parashar, M., Hariri, S., T., H., and Fox, G. "An interpretive framework for application performance prediction." Technical Report SCCS-479, Syracuse University, NPAC, Syracuse, NY, April 1993. [Parashar:93b]

91. Ponnusamy, R., Mansour, N., Choudhary, A., and Fox, G. C. "Mapping realistic data sets on parallel computers," in *Proceedings of International Parallel Processing Symposium, IPPS '93*, pages 123–128, April 1993. CRPC-TR92265, SCCS-366. [Ponnusamy:93a]

92. Ranka, S., Kaddoura, M., Wang, A., and Fox, G. "Heterogeneous computing on heterogeneous systems: Software and application issues." Technical Report SCCS-525, Syracuse University, NPAC, Syracuse, NY, August 1993. [Ranka:93a]

93. Rose, K., Gurewitz, E., and Fox, G. C. "Constrained clustering as an optimization method," *IEEE Trans. on Pattern Recognition and Machine Intelligence*, 15(8):785–794, August 1993. C3P-919; SCCS-21. [Rose:93a]

94. Stein, J., and Fox, G. C. "Dependence analysis for outer loop parallelization of existing Fortran-77 programs," *Concurrency: Practice and Experience*, 5(8):659–674, December 1993. SCCS-339b; CRPC-TR92261. [Stein:93a]

95. Thakur, R., Choudhary, A., and Fox, G. "Complete exchange on a wormhole routed mesh." Technical Report SCCS-505, Syracuse University, NPAC, Syracuse, NY, July 1993. [Thakur:93a]

96. Ahmad, I., Ghafoor, A., and Fox, G. "Hierarchical scheduling of dynamic parallel computations on hypercube multicomputers," *Journal of Parallel and Distributed Computing*, 20(3), March 1994. Syracuse University, NPAC Technical Report SCCS-221b. [Ahmad:94b]

97. Anupindi, K., Skjellum, A., Coddington, P., and Fox, G. "Parallel differential-algebraic equations (DAE) solvers for power system transient stability analysis." Technical Report SCCS-563, Syracuse University, NPAC, Syracuse, NY, March 1994. [Anupindi:94a]

98. Bogucz, E., Fox, G., Haupt, T., Hawick, K., and Ranka, S. "Preliminary evaluation of high-performance Fortran as a language for computational fluid dynamics." Technical Report SCCS-625, Syracuse University, NPAC, Syracuse, NY, June 1994. Published in *Proc. AIAA 25th Computational Fluid Dynamics Conference*, Colorado Springs, AIAA 94-2262. [Bogucz:94a]

99. Bozkus, Z., Choudhary, A., Fox, G., Haupt, T., Ranka, S., and Wu, M.-Y. "Compiling Fortran 90D/HPF for distributed memory MIMD computers," in *Journal of Parallel and Distributed Computing*, pp 15–26 (1994). Syracuse University, NPAC Technical Report SCCS-444, March 1993. [Bozkus:94a]

100. Cheng, G., Fox, G., Mills, K., and Podgorny, M. "Developing interactive PVM-based parallel programs on distributed computing systems with AVS framework." Technical Report SCCS-611, Syracuse University, NPAC, Syracuse, NY, January 1994. Published in

Proceedings of the 3rd Annual International AVS Conference, JOIN THE REVOLUTION: AVS'94, held in Boston, MA. [Cheng:94a]

101. Cheng, G., Lu, Y., Fox, G., Mills, K., and Haupt, T. "An interactive remote visualization environment for an electromagnetic scattering simulation on a high performance computing system." Technical Report SCCS-573, Syracuse University, NPAC, Syracuse, NY, January 1994. Published in *Proc. Supercomputing 1993*, pages 317–326. [Cheng:94b]

102. Cheng, G., Hawick, K., Mortensen, G., and Fox, G. "Distributed computational electromagnetics systems." Technical Report SCCS-635, Syracuse University, NPAC, Syracuse, NY, August 1994. Published in *Proceedings of the 7th SIAM Conference on Prallel Processing for Scientific Computing* held February 15–17, 1995. [Cheng:94c]

103. Cheng, G., Fox, G., and Mills, K. "Integrating multiple programming paradigms on Connection Machine CM5 in a dataflow-based software environment (draft)." Technical Report SCCS-548, Syracuse University, NPAC, Syracuse, NY, October 1994. [Cheng:94d]

104. Cheng, G., Fox, G., and Hawick, K. "A scalable paradigm for effectively-dense matrix formulated applications," volume 797 of *Lecture Notes in Computer Science*, pages 202–210. Springer-Verlag, April 1994. Proceedings of the European Conference and Exhibition on High-Performance Computing and Networking (HPCN Europe) 1994, Munich, Germany; Syracuse University Technical Report SCCS-580. [Cheng:94e]

105. Choudhary, A., Dincer, K., Fox, G., and Hawick, K. "Conjugate gradient algorithms implemented in high performance Fortran." Technical Report SCCS-639, Syracuse University, NPAC, Syracuse, NY, October 1994. [Choudhary:94c]

106. Chrisochoides, N., Haupt, T., and Fox, G. "Computational toolkit for colliding black holes and CFD." Technical Report SCCS-626, Syracuse University, NPAC, Syracuse, NY, July 1994. [Chrisochoides:94a]

107. Chrisochoides, N., Mansour, N., and Fox, G. "Performance evaluation of data mapping algorithms for parallel single-phase iterative PDE solvers." Technical Report SCCS-551, Syracuse University, NPAC, Syracuse, NY, October 1994. [Chrisochoides:94b]

108. Chrisochoides, N., Fox, G., and Thompson, J. "Parallel grid generation on distributed memory MIMD machines for three-dimensional general domains." Technical Report SCCS-672, Syracuse University, NPAC, Syracuse, NY, December 1994. [Chrisochoides:94d]

109. Chrisochoides, N., Chatterjee, A., Rajani, V., and Fox, G. "Parallel structured grid generation." Technical Report SCCS-674, Syracuse University, NPAC, Syracuse, NY, March 1994. [Chrisochoides:94c]

110. Copty, N., Ranka, S., Fox, G., and Shankar, R. "A data parallel algorithm for solving the region growing problem on the Connection Machine," *Journal of Parallel and Distributed Computing*, 21(1), 1994. Syracuse University, NPAC Technical Report SCCS-596. [Copty:94a]

111. del Rosario, J. M., and Fox, G. "Constant bit rate network transmission of variable bit rate continuous media in video-on-demand servers." Technical Report SCCS-677, Syracuse University, NPAC, Syracuse, NY, December 1994. [Rosario:94a]

112. Dincer, K., Bozkus, Z., Ranka, S., and Fox, G. "Evaluating the performance of CM-5 multicomputer." Technical Report SCCS-662, Syracuse University, NPAC, Syracuse, NY, August 1994. [Dincer:94a]

113. Fox, G., and Mills, K. *Information Processing and Opportunities for HPCN Use in Industry*, pages 1–14. Number 796 in Lecture Notes in Computer Science. Springer-Verlag, New York, April 1994. Proceedings of HPCN Europe 1994, "High Performance Computing and Networking." SCCS-610. [Fox:94b]

114. Fox, G., and Mills, K. "Information processing and HPCC applications in industry," in *Proceedings of Annual 1994 Dual-use Conference*, Utica, NY, May 1994. IEEE Mohawk Valley. SCCS-598. [Fox:94c]

115. Fox, G., Hariri, S., Chen, R., Mills, K., and Furmanski, W. "Applications and enabling technology for NYNET upstate corridor." Technical Report SCCS-465, Syracuse University, NPAC, Syracuse, NY, January 1994. [Fox:94d]

116. Fox, G., Furmanski, W., Hawick, K., and Leskiw, D. "Exploration of the InfoMall concept." Technical Report SCCS-634, Syracuse University, NPAC, Syracuse, NY, August 1994. [Fox:94f]

117. Fox, G., and Hawick, K. "An applications perspective on high performance Fortran." Technical Report SCCS-641, Syracuse University, NPAC, Syracuse, NY, November 1994. [Fox:94g]

118. Fox, G., Hawick, K., Podgorny, M., and Mills, K. "The electronic InfoMall—HPCN enabling industry and commerce," volume 919 of *Lecture Notes in Computer Science*, pages 360–365. Springer-Verlag, November 1994. Syracuse University Technical Report SCCS-665. [Fox:94h]

119. Fox, G. "Involvement of industry in the national high performance computing and communication enterprise," in *Developing a Computer Science Agenda for High Performance Computing*, U. Vishkin (editor), ACM Press. Technical Report SCCS-716, Syracuse University, NPAC, Syracuse, NY, May 1994. [Fox:94i]

120. Fox, G., and Hawick, K. "High performance Fortran for applications." Technical Report SCCS-524, Syracuse University, Syracuse, NY, August 1994. [Fox:94j]

121. Fox, G., and Mills, K. "High performance computing and communication—yet another revolution in education," in *Proceedings of the Fourth Annual 1994 Dual-use Technologies and Applications Conference*, pages 220–228. IEEE Mohawk Valley, May 1994. Syracuse University, NPAC, Technical Report SCCS-618. [Fox:94k]

122. Hariri, S., and Fox, G. "Applications and enabling technology for NYNET upstate corridor." Technical Report SCCS-642, Syracuse University, NPAC, Syracuse, NY, November 1994. [Hariri:94a]

123. Hariri, S., Park, S., Reddy, R., Subramanyan, M., Yadav, R., Fox, G., and Parashar, M. "Software tool evaluation methodology." Technical Report SCCS-643, Syracuse University, NPAC, Syracuse, NY, November 1994. [Hariri:94b]

124. Hawick, K., Bogucz, E., Degani, A., and Fox, G. "High performance Fortran for computational fluid dynamics applications." Technical Report SCCS-638, Syracuse University, NPAC, Syracuse, NY, September 1994. [Hawick:94a]

125. Hawick, K., and Fox, G. "Exploiting high performance Fortran for computational fluid dynamics," volume 919 of *Lecture Notes in Computer Science*, pages 413–419. Springer-Verlag, May 1995. International Conference on High Performance Computing and Networking, HPCN Europe 1995, Milan; Syracuse University Technical Report SCCS-661. [Hawick:94b]

126. Koester, D., Ranka, S., and Fox, G. "Parallel Choleski factorization of block-diagonal bordered sparse matrices." Technical Report SCCS-604, Syracuse University, NPAC, Syracuse, NY, January 1994. [Koester:94a]

127. Koester, D., Ranka, S., and Fox, G. "Power systems transient stability—a grand computing challenge." Technical Report SCCS-549, Syracuse University, NPAC, Syracuse, NY, October 1994. [Koester:94c]

128. Koester, D., Ranka, D., and Fox, G. "Parallel LU factorization of block-diagonal-bordered sparse matrices." Technical Report SCCS-550, Syracuse University, NPAC, Syracuse, NY, October 1994. [Koester:94d]

129. Koester, D., Ranka, S., and Fox, G. "Parallel block-diagonal-bordered sparse linear solvers for electrical power system applications." Technical Report SCCS-552, Syracuse University, NPAC, Syracuse, NY, October 1994. [Koester:94e]

130. Koester, D., Ranka, S., and Fox, G. "Parallel direct methods for block-diagonal-bordered sparse matrices." Technical Report SCCS-679, Syracuse University, NPAC, Syracuse, NY, December 1994. [Koester:94f]

131. Koester, D., Ranka, S., and Fox, G. "A parallel Gauss-Seidel algorithm for sparse power systems matrices," in *Proceedings of Supercomputing 94*, pages 184–193. IEEE Comptuer Society Press, November 1994. Syracuse University, NPAC, Technical Report SCCS-630. [Koester:94h]

132. Leung, A., Skjellum, A., and Fox, G. "Concurrent DASSL: a second-generation DAE solver library," in A. Skjellum, editor, *Scalable Parallel Libraries Conference*, 1994. Syracuse University, NPAC Technical Report SCCS-562. [Leung:94a]

133. Mansour, N., and Fox, G. "Parallel physical optimization algorithms for allocating data to multicomputer nodes," *Journal of Supercomputing*, 8(1), March 1994. SCCS-305; CRPC-TR92259. [Mansour:94b]

134. Mansour, N., and Fox, G. C. "Allocating data to distributed-memory multiprocessors by genetic algorithms," *Concurrency: Practice and Experience*, 6(6):485–504, September 1994. Technical Report SCCS-349, Syracuse University, NPAC, Syracuse, NY. [Mansour:94a]

135. Mills, K., and Fox, G. "InfoMALL: an innovative strategy for high-performance computing and communications applications development," *Internet Research*, 4:31–45, 1994. SCCS-530. [Mills:94a]

136. Mills, K., Fox, G., Shelly, B., and Bossert, S. "The living textbook: A demonstration of information on demand technologies in education." Technical Report SCCS-647, Syracuse University, NPAC, Syracuse, NY, October 1994. [Mills:94c]

137. Parashar, M., Hariri, S., Haupt, T., and Fox, G. "Interpreting the performance of HPF/Fortran 90D," in *Proceedings of Supercomputing 94*, pages 743–752. IEEE Computer Society Press, November 1994. Syracuse University, NPAC, Technical Report SCCS-645. [Parashar:94b]

138. Ponnusamy, R., Thakur, R., Choudhary, A., Velamakanni, K., Bozkus, Z., and Fox, G. "Experimental performance evaluation of the CM-5," *Journal of Parallel and Distributed Computing*, 19:192–202, March 1994. SCCS-616. [Ponnusamy:94a]

139. Rousselle, P., Tymann, P., Hariri, S., and Fox, G. "The virtual computing environment," in *Proceedings of the Third IEEE International Symposium on High Performance Distributed Computing*, pages 7–14. IEEE Computer Society Press, April 1994. Syracuse University, NPAC, Technical Report SCCS-646. [Rousselle:94c]

140. Thakur, R., Choudhary, A., and Fox, G. "Runtime array redistribution in HPF programs." Technical Report SCCS-601, Syracuse University, NPAC, Syracuse, NY, January 1994. [Thakur:94a]

141. Browne, S., Dongarra, J., Fox, G., Hawick, K., Kennedy, K., Stevens, R., Olson, R., and Rowan, T. "Distributed information management in the national HPCC software exchange." Technical Report SCCS-722, Syracuse University, NPAC, Syracuse, NY, July 1995. [Browne:95a]

142. Browne, S., Dongarra, J., Green, S., Moore, K., Rowan, T., Wade, R., Fox, G., Hawick, K., Pool, J., Stevens, R., Olson, B., and Disz, T. "The national HPCC software exchange," *IEEE Computational Science and Engineering*, 2(2):62–69, Summer 1995. Syracuse University, NPAC, Technical Report SCCS-712. [Browne:95c]

143. Degani, A. and Fox, G. "Application of parallel multigrid methods to unsteady flow: A performance evaluation." Technical Report SCCS-738, Syracuse University, NPAC, Syracuse, NY, 1995. [Degani:95a]

144. Degani, A., and Fox, G. "Parallel multigrid computation of the unsteady incompressible Navier-Stokes equations." Technical Report SCCS-739, Syracuse University, NPAC, Syracuse, NY, 1995. [Degani:95b]

145. del Rosario, J. M., Podgorny, M., and Fox, G. "m-Frame granular transport and buffer requirements for VBR encoded media in VOD servers." Technical Report SCCS-733, Syracuse University, NPAC, Syracuse, NY, March 1995. [Rosario:95a]

146. Dincer, K., Fox, G., and Hawick, K. "High Performance Fortran and possible extensions to support conjugate gradient algorithms," in *Proceedings of Fifth IEEE International Symposium on High-Performance Distributed Computing*, pp. 69–77, August 1996. Syracuse University Technical Report SCCS-703b. [Dincer:95c]

147. Fox, G., Furmanski, W., Chen, M., Rebbi, C., and Cowie, J. "WebWork: Integrated programming environment tools for national and grand challenges." Technical Report SCCS-715, Syracuse University, NPAC, Syracuse, NY, June 1995. Joint Boston-CSC-NPAC project plan to develop WebWork. [Fox:95a]

148. Fox, G., Furmanski, W., Hawick, K., and Leskiw, D. "Exploration of the InfoMall concept—building on the electronic InfoMall." Technical Report SCCS-711, Syracuse University, NPAC, Syracuse, NY, May 1995. [Fox:95b]

149. Fox, G. "Software and hardware requirements for some applications of parallel computing to industrial problems." Technical Report SCCS-717, Syracuse University, NPAC, Syracuse, NY, June 1995. To appear in ICASE book. [Fox:95c]

150. Fox, G., and Furmanski, W. "The use of the national information infrastructure and high performance computers in industry," in *Proceedings of the Second International Conference on Massively Parallel Processing using Optical Interconnections*, pages 298–312, October 1995. IEEE Computer Society Press, Los Alamitos, CA. Syracuse University Technical Report SCCS-732. [Fox:95d]

151. Fox, G. "Basic Issues and Current Status of Parallel Computing." Technical Report SCCS-736, Syracuse University, NPAC, Syracuse, NY, November 1995. [Fox:95e]

152. Fox, G. "High performance distributed computing." Technical Report SCCS-750, Syracuse University, NPAC, Syracuse, NY, December 1995. To appear in Encyclopedia of Computer Science and Technology. [Fox:95f]

153. Fox, G., Bogucz, E., Jones, D., Mills, K., Podgorny, M., and Hawick, K. "A scalable organisation for the development of high performance computing and communications software and systems." Technical Report SCCS-721, Syracuse University, NPAC, Syracuse, NY, April 1995. [Fox:95h]

154. Fox, G., Hawick, K., Haupt, T., Bogucz, E., and Roe, K. "Application of high performance Fortran." Technical Report SCCS-727, Syracuse University, NPAC, Syracuse, NY, July 1995. [Fox:95i]

155. Fox, G., Hawick, K., and Ranka, S. "HPF templates for data parallel applications." Technical Report SCCS-734, Syracuse University, NPAC, Syracuse, NY, September 1995. [Fox:95j]

156. Fox, G., Hawick, K., and White, A. "Characteristics of HPC scientific and engineering applications." Technical Report SCCS-741, Syracuse University, NPAC, Syracuse, NY. Report of Working Group 2 of the *Second Pasadena Workshop on System Software and Tools for High Performance Computing Environments*, 1995. [Fox:95k]

157. Fox, G. C., Furmanski, W., Hornberger, P., Niemiec, J., and Simoni, D. "Implementing televirtuality," in R. A. Earnshaw, J. A. Vince, and H. Jones, editors, *Virtual Reality Applications*, chapter 7, pages 91–122. Academic Press Ltd., 1995. Syracuse University, NPAC, Technical Report SCCS-718. [Fox:95l]

158. Hawick, K., Dincer, K., Robinson, G., and Fox, G. "Conjugate gradient algorithms in Fortran 90 and high performance Fortran." technical Report SCCS-691, Syracuse University, NPAC, Syracuse, NY, February 1995. [Hawick:95a]

159. Hawick, K., Bogucz, E., Degani, A., Fox, G., and Robinson, G. "CFD algorithms in high performance Fortran." Technical Report SCCS-737, Syracuse University, NPAC, Syracuse, NY, 1995. [Hawick:95d]

160. Mills, K., Fox, G., Coddington, P., Mihalas, B., Podgorny, M., Shelly, B., and Bossert, S. "The living textbook and the K–12 classroom of the future." Technical Report SCCS-731, Syracuse University, NPAC, Syracuse, NY, July 1995. [Mills:95a]

161. Ou, C.-W., Ranka, S., and Fox, G. "Fast and parallel mapping algorithms for irregular problems." Technical Report SCCS-729, Syracuse University, NPAC, Syracuse, NY, July 1995. [Ou:95a]

162. Robinson, G., Hawick, K., and Fox, G. "Fortran 90 and high performance Fortran for dense matrix-formulated applications." Technical Report SCCS-709, Syracuse University, NPAC, Syracuse, NY, May 1995. [Robinson:95a]

163. Yadav, R., Reedy, R., Hariri, S., and Fox, G. "A multithreaded message passing environment for ATM LAN/WAN." Technical Report SCCS-690, Syracuse University, NPAC, Syracuse, NY, February 1995. [Yadav:95a]

164. Cheng, G., Sokolowski, P., Podgorny, M., and Fox, G. "WWW search systems using SQL*TextRetrieval and Parallel Server for structured and unstructured data." Technical Report SCCS-752, Syracuse University, NPAC, Syracuse, NY, January 1996. [Cheng:96a]

165. Fox, G. C. "A tale of two applications on the NII." Technical Report SCCS-756, Syracuse University, NPAC, Syracuse, NY, March 1996. Submitted to the 1996 Sixth Annual IEEE Dual-Use Technologies and Applications Conference. [Fox:96a]

166. Fox, G. C. "An application perspective on high-performance computing and communications." Technical Report SCCS-757, Syracuse University, NPAC, Syracuse, NY, April 1996. [Fox:96b]

167. Fox, G. C., and Furmanski, W. "SNAP, Crackle, WebWindows!." Technical Report SCCS-758, Syracuse University, NPAC, Syracuse, NY, April 1996. [Fox:96c]

168. Fox, G. C., and Mills, K. "Opportunities for HPCC use in industry: Opportunities for a new software industry in HPCC," in A. Y. Zomaya, editor, *Parallel Computing: Paradigms and Applications*, chapter 17, pages 455–479. International Thomson Computer Press, 1996. Syracuse University, NPAC, Technical Report SCCS-617. [Fox:96d]

169. Yau, H., Leung, A., Furmanski, W., and Fox, G. "Exploration of Emerging HPCN Technologies for Web-based Distributed Computing." Technical Report SCCS-755, Syracuse University, NPAC, Syracuse, NY, February 1996. [Yau:96a]

Books Edited

Phenomenology in Particle Physics, 1971, (with C. B. Chiu and A. J. G. Hey), Proceedings of a conference at Caltech (organized by C. B. Chiu and G. C. Fox) in 1971.

Hypercube Concurrent Computers and Applications, Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications, published by ACM, 1988.

Books Authored

Solving Problems in Concurrent Processors—Volume 1, with M. Johnson, G. Lyzenga, S. Otto, J. Salmon, D. Walker, Prentice Hall, March 1988.

Solving Problems in Concurrent Processors—Volume 2, with I. Angus, J. Kim, D. Walker, Prentice Hall, 1990.

Supercomputer Applications of the Hypercube, published in *Supercomputing Systems*, Chapter 11, pp. 480–577 by Van Nostrand Reinhold Publishing House, New York, N.Y. editors Steve and Lana Kartashev (1989).

Parallel Computing Works!, with P. Messina, R. Williams, Morgan Kauffman (1994).

Journals

Supervisory Editor, *Nuclear Physics B* (1975–1986).

Member of the Editorial Board:

The Journal of Supercomputing (1987–)

Computer Physics Communications (1987–1994)

International C3IS Journal: Command, Control, Communications and Information Systems (1987–1990)

Principal Editor:

Concurrency: Practice and Experience (1989–)

Physics and Computers: International Journal of Modern Physics C (1990–)

Awards

Alfred P. Sloan Foundation Fellowship (1973-1975)

Fellow of the American Physical Society (1990)

Lecture Notes

"Phenomenology of Particle Physics," lecture notes for Physics 231, CALT-68-837, unpublished, 1980.

Conferences Organized

1. Caltech 1971 (with C. B. Chiu) on "High Energy Physics Phenomenology."
2. Caltech 1979 on "Gauge Theories and Related High Energy Physics (Experimental and Theoretical) Topics."
3. JPL 1988 "Third Conference on Hypercube Concurrent Computers and Applications;" Chairperson of program committee.
4. Syracuse 1992 "First International Symposium on High-Performance Distributed Computing," Conference Chair.
5. Spokane 1993 "Second International Symposium on High-Performance Distributed Computing," Conference Chair.
6. San Francisco 1994 "Third International Symposium on High-Performance Distributed Computing," Conference Chair.
7. Washington, D.C. 1995 "Fourth International Symposium on High-Performance Distributed Computing," Conference Chair.
8. Syracuse 1996 "Fifth International Symposium on High Performance Distributed Computing," Conference Chair.

Unpublished Concurrent Computation Papers

1. Brooks, E., Gupta, R., Martin, O., Otto, S., DeBenedictis, E., "Nearest Neighbor Concurrent Processor," CALT-68-867, Caltech report C3P-1 (1981).
2. Brooks, E. and Fox, G. C., "A Simple Mail Box Communications Package for the NNCP," CALT-68-920, Caltech report C3P-2 (1982).
3. Fox, G. C., "Matrix Operations on the Homogeneous Machine," CALT-68-939, Caltech report C3P-5 (1982).

4. Fox, G. C., "Decomposition of Scientific Problems for Concurrent Processors," CALT-68-986, Caltech report C3P-28 (1983).

5. Fox, G. C., "The Cyclic Jacobi Method for Eigenvalues of Symmetric Matrices," Caltech report C3P-82 (1984).

6. Fox, G. C., "Eigenvalues of Symmetric Tridiagonal Matrices," Caltech report C3P-95 (1984).

7. Fox, G. C., "Square Matrix Decomposition: Symmetric, Local, Scattered," Caltech report C3P-97 (1984).

8. Fox, G. C., "Householder's Tridiagonalization Technique," Caltech report C3P-98 (1984).

9. Fox, G. C., "LU Decomposition for Banded Matrices," Caltech report C3P-99 (1984).

10. Fox, G. C., "Use of Concurrent Processors in (High Energy Physics) Data Analysis," Caltech report C3P-129 (1984).

11. Fox, G. C., "On the Sequential Component of Computation," Caltech report C3P-130 (1984).

12. Fox, G. C. and Jefferson, D., "Concurrent Processor Load Balancing as a Statistical Physics Problem," Caltech report C3P-172 (1985).

13. Fox, G. C., "Concurrent Scalar Products on the Hypercube," Caltech report C3P-173 (1985).

14. Fox, G. C., "Implementation of High Performance Crystalline Operating System on the INTEL iPSC Hypercube," Caltech report C3P-247 (1986).

15. Fox, G. C., "Iterative Full Matrix-Vector Multiplication on the Hypercube," Caltech report C3P-336 (1986).

16. Fox, G. C., "An Overview of Ten Challenge Problems on the Hypercube," Caltech report C3P-338 (1986).

17. Fox, G. C., Chen, M., DeBenedictis, E., Li, J., Walker, D., "Hypercubes are General—Purpose Multiprocessors with High Speed Up," Caltech report C3P-499 (1987).

18. Fox, G. C. and Frey, A., "High Performance Parallel Supercomputing Application, Hardware, and Software Issues for a Teraflop Computer," Caltech report C3P-451b (1988).

19. Fox, G. C. and Messina, P., "The Caltech Concurrent Computation Program Annual Report 1986–1987," Caltech report C3P-487 (1987).

20. Felten, E., Fox, G. C. and Otto, S., "A Uniform Programming Environment for Synchronous and Loosely Synchronous Problems; SIMD and MIMD Parallel Computers," Caltech report C3P-656 (1988).

21. Fox, G. C. and Messina, P., "Report for 1988 on the Caltech Concurrent Computation Program," Caltech report C3P-685 (1988).

22. Saltz, J., Mirchandaney, R., Fox, G., and Nicol, D., "The Design of a Run-time System Integrable with Programming Environments for Distributed Memory Machines," Caltech report C3P-700 (1989).

23. Fox, G. C., "Experience on the Hypercube," Caltech report C3P-716 (1989).

24. Fox, G. C., "A Report on Advanced Architectures to the Technical Options Group," Caltech report C3P-718 (1989).

25. Fox, G. C., "A Note on Neural Networking for Trackfinding," Caltech report C3P-748 (1989).

Syracuse University Internal Reports

1. Fox, G., Choudhary, A., and Ranka, S. "Developing large industrial applications on nCUBE-2." Technical Report SCCS-27, Syracuse University, NPAC, Syracuse, NY, December 1990. [Fox:90ee]

2. Fox, G., Ranka, S., and Choudhary, A. "Development of software and applications for parallel processors." Technical Report SCCS-34, Syracuse University, NPAC, Syracuse, NY, December 1990. A joint study with IBM Yorktown. [Fox:90gg]

3. Fox, G. C. "Syracuse University, NPAC school of management project." Technical Report SCCS-100, Syracuse University, NPAC, Syracuse, NY, May 1991. A proposal from the Northeast Parallel Architectures Center. [Fox:91gg]

4. Apostolakis, J., Falcioni, M., Fox, G., and Han, L. "Some preliminary benchmarks for the CM-5." Technical Report SCCS-405, Syracuse University, NPAC, Syracuse, NY, November 1992. [Apostolakis:92c]

5. Chen, T., Feeney, J., Fox, G., Frieder, G., Ranka, S., and Yu, F. "A switch for scalable high-performance distributed computing." Technical Report SCCS-392, Syracuse University, NPAC, Syracuse, NY, November 1992. [Chen:92c]

6. Cheng, G., and Fox, G., "An interactive graphic tool for the option price modeling on DECmpp-12000 using AVS," Technical Report SCCS-369, Syracuse University, NPAC, Syracuse, NY, September 1992. [Cheng:92b]

7. Fox, G. "Questions and answers for GE task force." Technical Report SCCS-304, Syracuse University, NPAC, Syracuse, NY, May 1992. [Fox:92p]

8. Fox, G., Ranka, S., Furmanski, W., and Choudhary, A. "Scalable portable systems for high performance computing." Technical Report SCCS-364, Syracuse University, NPAC, Syracuse, NY, July 1992. [Fox:92s]

9. Fox, G., and Bogucz, E. "Research experiences for undergraduates site: Undergraduate research experience in computation science." Technical Report SCCS-409, Syracuse University, NPAC, Syracuse, NY, December 1992. [Fox:92t]

10. Mohamed, A., Fox, G., von Laszewski, G., Parashar, M., Haupt, T., Mills, K., Lu, Y., Lin, N., and Yeh, N. "Applications benchmarking set for Fortran-D and high performance Fortran." Technical Report SCCS-327, Syracuse University, NPAC, Syracuse, NY, June 1992. [Mohamed:92b]

11. Chen, T., Feeney, J., Fox, G., Frieder, G., Ranka, S., Wilhelm, B., and Yu, F. "A low-latency programming interface and a prototype switch for scalable high-performance distributed computing." Technical Report SCCS-523, Syracuse University, NPAC, Syracuse, NY, July 1993. [Chen:93a]

12. Fox, G., Hariri, S., Chen, R., Mills, K., and Podgorny, M. "InfoVision project." Technical Report SCCS-575, Syracuse University, NPAC, Syracuse, NY, December 1993. [Fox:93g]

13. Podgorny, M., and Fox, G. "Northeast parallel architectures center computational facility." Technical Report SCCS-512, Syracuse University, NPAC, Syracuse, NY, August 1993. [Podgorny:93a]

14. Choudhary, A., Foster, I., Fox, G., Kennedy, K., Kesselman, C., Koelbel, C., Saltz, J., and Marc, S. "Languages, compilers, and runtime systems support for parallel input-output." Technical Report SCCS-606, Syracuse University, NPAC, Syracuse, NY, January 1994. [Choudhary:94b]

15. Degani, A., and Fox, G. "Derivation of the beam and warming algorithm for compressible Navier-Stokes equations." Technical Report SCCS-675, Syracuse University, NPAC, Syracuse, NY, December 1994. [Degani:94a]

16. Degani, A., and Fox, G. "Discussion of the NAS parallel benchmark for CFD." Technical Report SCCS-676, Syracuse University, NPAC, Syracuse, NY, December 1994. [Degani:94b]

17. Kao, K.-L., Cheng, G., Podgorny, M., and Fox, G. "Benchmarking on ORACLE 7.1.3 parallel server on the nCUBE 2 performance diagnostic and tuning tools." Technical Report SCCS-695, Syracuse University, NPAC, Syracuse, NY, 1995. [Kao:95a]

18. Lin, T.-H., Haupt, T., and Fox, G. "Parallelization of MOPAC." Technical Report SCCS-744, Syracuse University, NPAC, Syracuse, NY, 1995. [Lin:95a]