McGill University
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ACAPS Laboratory

Advanced Compilers, Architectures
and Parallel Systems

ACAPS List of Publications

Compiled by
Kevin B. Theobald

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1 ACAPS Technical Memos

The following are completed reports in the ACAPS Technical Memos series. Underlined numbers indicate documents available via anonymous ftp from ftp-acaps.cs.mcgill.ca:pub/doc/memos.

01 G. R. Gao and René Tio. Instruction set definition for the argument-fetching dataflow machine. February 1988.

02 G. R. Gao and Z. Paraskevas. Efficient software pipelining in an argument-fetching dataflow architecture. March 1988.

02 (Rev) G. R. Gao and Z. Paraskevas. Efficient software pipelining in an argument-fetching dataflow architecture. October 1988.

03 Guang R. Gao and Herbert H. J. Hum. Function application support in the argument-fetching dataflow architecture. April 1988.

04 ACAPS Group. ACAPS list of publications. Frequently updated.

05 Guang R. Gao and Guy Tremblay. Efficient demand-driven evaluation on argument-fetching dataflow architecture. October 1988.

06 G. R. Gao. Monolithic array and its efficient eager evaluation. November 1988.

06 (Rev) G. R. Gao and R. K. Yates. Monolithic array and its efficient eager evaluation. July 1989.

07 G. R. Gao. A flexible architecture model for hybrid dataflow and control-flow evaluation. January 1989.

08 Guy Tremblay and Guang R. Gao. A formal operational model for data-driven program tuples. April 1989.

09 G. R. Gao and Jean Marc Monti. Interprocessor communication support in an argument-fetching dataflow architecture – preliminary version. March 1989.

10 Guang R. Gao. A framework for efficient fine-grain loop scheduling. November 1989.

10 (Rev) Guang R. Gao, Herbert H. J. Hum, and Yue-Bong Wong. An efficient method of fine-grain loop scheduling. January 1990.

11 G. R. Gao. A flexible architecture model for hybrid dataflow and control-flow evaluation. August 1989.

12 G. R. Gao and Z. Paraskevas. Compiling for dataflow software pipelining. July 1989.

12 (Rev) G. R. Gao and Z. Paraskevas. Compiling for dataflow software pipelining. August 1989.

13 Herbert H. J. Hum and Guang R. Gao. A register-cache for fine-grain multi-thread computing. August 1990.

15 Guang R. Gao, Herbert H. J. Hum, and Yue-Bong Wong. Program structure, compiler and architecture tradeoff for efficient fine-grain parallelism. September 1989.

15 (Rev) Guang R. Gao, Herbert H. J. Hum, and Yue-Bong Wong. An efficient method of fine-grain loop scheduling. May 1990.

16 Guang R. Gao, Herbert H. J. Hum, and Yue-Bong Wong. A dynamic argument-fetching dataflow architecture model. February 1990.

17 Herbert H. J. Hum and Guang R. Gao. A novel high-speed memory organization for fine-grain multi-thread computing. February 1991.

18 Guang R. Gao, Yue-Bong Wong, and Qi Ning. A Petri-Net model for fine-grain loop scheduling. January 1991.

19 G. R. Gao, Robert Kim Yates, Jack B. Dennis, and Lenore Restifo Mullin. An efficient monolithic array constructor. June 1990.

19 (rev) G. R. Gao, Robert Kim Yates, Jack B. Dennis, and Lenore Restifo Mullin. An efficient monolithic array constructor. September 1990.

20 Guang R. Gao and Clifford Sobkowicz. An efficient solution of tridiagonal linear systems on a dataflow architecture. May 1991.

21 Kevin B. Theobald and Guang R. Gao. An efficient parallel solution for the all pairs examination problem. March 1991.

22 Guang R. Gao and Vivek Sarkar. Optimization of array access by collective loop transformations. December 1990.

23 Qi Ning and G. R. Gao. Loop storage optimization for dataflow machines. August 1991.

24 Guang R. Gao and Nematollaah Shiri V. Unimodular transformations of 2_D monolithic array constructors. July 1991.

25 Jean-Marc Monti. Interprocessor communications and the McGill multiprocessor dataflow architecture. July 1991.

26 Guang R. Gao, R. Govindarajan, and Prakash Panangaden. Construction rules for well-behaved stream programs. April 1992.

28 Laurie J. Hendren and Guang R. Gao. Designing programming languages for analyzability: A fresh look at pointer data structures. September 1991.

29 Jack B. Dennis and Guang R. Gao. Multithreaded architectures: Principles, projects, and issues. February 1994.

30 Kevin B. Theobald. Panel sessions of The 1991 Workshop on Multithreaded Computers. April 1993.

31 ACAPS Group. List of external publications by members of ACAPS. Frequently updated.

32 Qi Ning and Guang R. Gao. Optimal memory allocation for argument fetching dataflow machines. January 1992.

33 Laurie J. Hendren, Guang R. Gao, Erik R. Altman, and Chandrika Mukerji. Register allocation using cyclic interval graphs. November 1991.

33 (Rev) Laurie J. Hendren, Guang R. Gao, Erik R. Altman, and Chandrika Mukerji. A register allocation framework based on hierarchical cyclic interval graphs. February 1993.

34 Laurie J. Hendren, Joseph Hummel, and Alexandru Nicolau. Abstractions for recursive pointer data structures: Improving the analysis and transformation of imperative programs. December 1991.

35 Herbert H. J. Hum and Guang R. Gao. Efficient support of concurrent threads in a hybrid dataflow/von Neumann architecture. September 1991.

36 Weiren Ding and Laurie J. Hendren. SELSYN-C: A self-synchronizing parallel programming language. February 1992.

37 Vincent H. Van Dongen and Guang R. Gao. A polynomial time method for optimal software pipelining. March 1992.

39 ZhiPing Qiu, Laurie J. Hendren, and Behcet Sarikaya. The design and implementation of a compiler for conformance testing. March 1992.

40 Kevin B. Theobald, Guang R. Gao, and Laurie J. Hendren. On the limits of program parallelism and its smoothability. June 1992.

41 Guang R. Gao, Russell Olsen, Vivek Sarkar, and Radhika Thekkath. Collective loop fusion for array contraction. March 1992.

42 Qi Ning and Guang R. Gao. Register allocation for time-optimal loop scheduling. July 1992.

42 (Rev) Qi Ning and Guang R. Gao. Register allocation for time-optimal loop scheduling. January 1993.

43 Nematollaah Shiri V. and Guang R. Gao. Unimodular transformations of monolithic array constructors. May 1992.

44 Russell Olsen and Guang Gao. Collective analysis and transformation of loop clusters. April 1992.

45 Guoning Liao, Guang R. Gao, and Vinod K. Agawal. A dynamically scheduled parallel DSP architectre for stream flow programming. June 1993.

46 Laurie J. Hendren, Chris Donawa, Maryam Emami, Guang R. Gao, Justiani, and Bhama Sridharan. Designing the McCAT compiler based on a family of structured intermediate representations. 1992.

47 Anne Rogers, John H. Reppy, and Laurie J. Hendren. Supporting SPMD execution for dynamic data structures. August 1992.

48 Sumithra Jagannath. DLX simulator directed profiling. July 1992.

49 Laurie J. Hendren, Guang R. Gao, and Vugranam Sreedhar. ALPHA: A family of structured intermediate representations for a parallelizing C compiler. November 1992.

50 Kevin B. Theobald. The W-Network: A new low-cost fault-tolerant multistage interconnection network. November 1992.

52 Kevin B. Theobald, Guang R. Gao, and Laurie J. Hendren. The effects of resource limitations on program parallelism. January 1993.

53 Guang R. Gao, Qi Ning, and Vincent Van Dongen. Software pipelining for nested loops. May 1993.

54 Maryam Emami, Rakesh Ghiya, and Laurie J. Hendren. Context-sensitive interprocedural points-to analysis in the presence of function pointers. November 1993.

55 Erik R. Altman, Vinod K. Agarwal, and Guang R. Gao. Genetic algorithms and cache replacement policy. September 1992.

57 Kevin B. Theobald, Guang R. Gao, and Laurie J. Hendren. Speculative execution and branch prediction on parallel machines. December 1992.

59 Anne Rogers, John H. Reppy, and Laurie J. Hendren. Data-driven SPMD execution for hierarchical data structures. October 1992.

60 Robert Yates and Guang Gao. A Kahn principle for networks of nonmonotonic real-time processes. December 1992.

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62 Rakesh Ghiya. Interprocedural analysis in the presence of function pointers. March 1992.

64 Cecile Moura. SuperDLX – a generic superscalar simulator. April 1993.

65 Kevin B. Theobald, Herbert H. J. Hum, and Guang R. Gao. A unified framework for hybrid access cache design and its applications. October 1993.

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69 R. Govindarajan, Guang R. Gao, and Palash Desai. Minimizing buffer requirements under rate-optimal schedule in regular dataflow networks. February 1994.

70 Vugranam C. Sreedhar, Yong fong Lee, and Guang R. Gao. DJ-graphs and their applications to flowgraph analyses. May 1994.

72 Laurie J. Hendren, Maryam Emami, Rakesh Ghiya, and Clark Verbrugge. A practical context-sensitive interprocedural analysis framework for C compilers. July 1993.

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78 Guang R. Gao and Vivek Sarkar. Location consistency: Stepping beyond the barriers of memory coherence and serializability. December 1994.

80 R. Govindarajan, Erik R. Altman, and Guang R. Gao. Minimizing register requirements under resource-constrained rate-optimal software pipelining. July 1994.

80 (Rev) R. Govindarajan, Erik R. Altman, and Guang R. Gao. Minimizing register requirements under resource-constrained rate-optimal software pipelining. June 1995.

81 Marija Čubrić and Prakash Panangaden. Monotone and nonmonotone dataflow networks. December 1993.

83 Marija Čubrić. Dataflow language embedded in CML. February 1994.

84 Shashank S. Nemawarkar, R. Govindarajan, Guang R. Gao, and Vinod K. Agarwal. Interconnection performance for multithreaded architectures: A study based on a closed system model. November 1993.

84 (Rev) Shashank S. Nemawarkar and Guang R. Gao. Performance analysis of multithreaded multiprocessors using an integrated system model. April 1995.

86 Luis A. Lozano C. and Guang R. Gao. Effective utilization of the reorder buffer for short-lived variables. July 1994.

87 Vipul Jain. Wish++: The C++ API for Tcl/Tk. August 1994.

88 Herbert H. J. Hum, Olivier Maquelin, Kevin B. Theobald, Xinmin Tian, Xinan Tang, Guang R. Gao, Phil Cupryk, Nasser Elmasri, Laurie J. Hendren, Alberto Jimenez, Shoba Krishnan, Andres Marquez, Shamir Merali, Shashank Nemawarkar, Prakash Panangaden, Xun Xue, and Yingchun Zhu. The Multi-Threaded Architecture multiprocessor. December 1994.

89 Nasser Elmasri, Herbert H. J. Hum, and Guang R. Gao. The Threaded Communication Library: Preliminary experiences on a multiprocessor with dual-processor nodes. December 1994.

90 Jack B. Dennis and Guang R. Gao. On memory models and cache management for shared-memory multiprocessors. December 1994.

91 Erik R. Altman, R. Govindarajan, and Guang R. Gao. Scheduling and mapping: Software pipelining in the presence of structural hazards. January 1995.

92 R. Govindarajan, Erik R. Altman, and Guang R. Gao. Co-scheduling hardware and software pipelines. January 1995.

93 Vugranam C. Sreedhar, Guang R. Gao, and Yong fong Lee. Efficient data flow analysis using DJ graphs: Elimination methods revisited. June 1995.

94 Vugranam C. Sreedhar and Guang R. Gao. An elimination-based approach to incremental data flow analysis. June 1995.

95 Vugranam C. Sreedhar, Guang R. Gao, and Yong fong Lee. A new framework for exhaustive and incremental data flow analysis using DJ graphs. July 1995.

96 Shashank S. Nemawarkar and Guang R. Gao. Measurement and modeling of EARTH-MANNA multithreaded architecture. July 1995.

2 ACAPS Technical Notes

The following are completed reports in the ACAPS Technical Notes series. Some Technical Notes prior to number 14 are called "Design Notes" although they share the same numbering sequence. A (D) indicates such a document.

01 W.-K. Hong. IF1 parser for HDDG. June 1988.

02 (D) R. Tio. The A-code assembly language reference manual. July 1988.

03 (D) R. Tio. DASM: The A-code data-driven assembler program reference manual. July 1988.

04 Herbert H. J. Hum and Guang R. Gao. Summary of the second workshop on frontier in functional programming and dataflow architecture. September 1988.

05 (D) Z. Paraskevas. Summary of the discussion for the expansion of instruction set of the argument-fetching architecture. November 1988.

06 (D) G. R. Gao and Z. Paraskevas. Dataflow software pipelining: A case study. February 1989. Presented as a short paper at the International Conference on Supercomputing '89, Crete, Greece, June 1989.

07 (D) W.-K. Hong. Information structures for an experimental multiprocessor system compiler. February 1989.

08 (D) I. Little. A hierarchical data dependency graph viewer. February 1989.

09 (D) G. R. Gao, S. J. Long, and S. J. Thomas. Mapping of a parallel SVD algorithm on the BBN Butterfly multiprocessor. April 1989.

10 G. R. Gao and R. Yates. The argument-fetching dataflow architecture project: A status report. May 1989.

11 P. Labute. Interconnection network simulation. April 1989.

12 (D) Z. Paraskevas. SISAL-Kernel: An experimental language for the argument-fetching architecture. June 1989.

13 (D) H. H. J. Hum and Y. B. Wong. A prototype of an argument-fetching dataflow machine interpreter/simulator. May 1989.

14 J. M. Monti. Evaluation of a GP1000 Butterfly computer. October 1989.

16 Yue-Bong Wong. AD reference manual (version 1.4). October 1989.

17 J. M. Monti. Dasm reference manual (version 1.4). November 1989.

18 Jacques Gava. The AT&T Concurrent C language system. June 1990.

19 E. R. Altman. An analysis of Architect's Workbench. March 1990.

20 Russell Olsen. Trace-driven cache simulation. May 1990.

21 M. Ravi Shanker. A study on the implementation of the A* – Viterbi search for large vocabulary isolated word recognition on a multiprocessor machine. October 1990.

22 Clément Pellerin. A hypercube simulator written in Concurrent C. October 1990.

23 Herbert H. J. Hum and Shashank Nemawarkar. Summary of the Super-Actor Machine presentation. October 1990.

24 R. Govindarajan and V. C. Sreedhar. On Id compiler: Dr. iannucci meeting. October 1990.

25 E. R. Altman. Super-actors and Iannucci threads. November 1990.

26 Nematollaah Shiri-Varnaamkhaasti. U_Transformer: An implementation of unimodular transformations of double loops. February 1991.

27 Bhama Sridharan. Creation and transformations of the abstract syntax tree. September 1991.

28 Chandrika Mukerji. Instruction scheduling at the RTL level. 1991.

29 Laurie J. Hendren and Guang R. Gao. Experiments on while loop unrolling for pointer data structures. July 1991.

31 Pierre Peladeau. On the length of the cyclic frustum in a SDSP-PN. August 1991.

32 Justiani and Cecile Moura. Comparison of MIPS and SPARC using PIXIE-PIXSTATS and SPA. May 1992.

33 Guy Tremblay. Strictness analysis based on forward abstract interpretation can not express head-strictness. September 1991.

34 Sumithra Jagannath. A parallel implementation of the A* algorithm on the BBN Butterfly. July 1992.

35 Justiani. Design of a framework for dependence testing in the AST (SIMPLE). May 1992.

36 Laurie J. Hendren and Bhama Sridharan. The SIMPLE AST - McCAT compiler. July 1992.

37 Qi Ning. Register allocation for parallel machines. August 1992.

38 Herbert H. J. Hum and Guang R. Gao. Supporting a dynamic SPMD model in a multi-threaded architecture. May 1993.

39 Christopher M. Donawa. McBURG: a kinder, gentler interface for producing BURG specifications. November 1992.

40 Herbert H. J. Hum, Kevin B. Theobald, and Guang R. Gao. Definition of the Multi-Threaded Architecture (MTA) model. October 1993.

41 Philippe Muller. Presentation of mannasim, a MANNA simulator. August 1994.

42 Palash Desai. An implementation of a framework for multi-rate scheduling. February 1994.

3 SOCS Technical Reports

The following Technical Reports published by the McGill University School of Computer Science were written by ACAPS members. These publications are available from the main department.

TR-SOCS-87.12 Guang R. Gao. Maximum pipelining of array computation—a data flow approach. September 1987.

TR-SOCS-87.13 Guang R. Gao. Algorithmic aspects of balancing techniques for pipelined data flow code generation. September 1987.

TR-SOCS-87.16 Guang R. Gao and S. J. Thomas. An optimal jacobi-like algorithm for the singular value decomposition. December 1987.

TR-SOCS-88.06	Jack B. Dennis and Guang R. Gao. An efficient pipelined dataflow processor architecture. February 1988.
TR-SOCS-88.16	Guang R. Gao, René Tio, and Herbert H. J. Hum. Design of an efficient dataflow architecture without data flow. August 1988.
TR-SOCS-89.9	Zaharias Paraskevas. Code generation for dataflow software pipelining. Science, McGill University, Montréal, Québec, January 1990.
TR-SOCS-89.10	Guang R. Gao. A flexible architecture model for hybrid dataflow and control-flow evaluation. September 1989.
TR-SOCS-89.11	Guang R. Gao and Z. Paraskevas. Compiling for dataflow software pipelining. September 1989.
TR-SOCS-90.10	Guang R. Gao, Herbert H. J. Hum, and Yue-Bong Wong. Towards efficient fine-grain software pipelining. May 1990.
TR-SOCS-91.8	Guang R. Gao and Qi Ning. Loop storage optimization for dataflow machines. August 1991.
TR-SOCS-92.1	Qi Ning and Guang R. Gao. Optimal memory allocation for argument fetching dataflow machines. January 1992.

4 ACAPS Doctoral Dissertations

The following dissertations have been written by ACAPS members. The supervisor of each thesis is listed in parentheses.

1. Herbert Hing-Jing Hum. *The Super-Actor Machine: a Hybrid Dataflow/von Neumann Architecture.* May 1992 (Gao).
2. Robert Kim Yates. *Semantics of Timed Dataflow Networks.* December 1992 (Gao).
3. Qi Ning. *Register Allocation for Optimal Loop Scheduling.* 1993 (Gao).
4. Guy Tremblay. *Parallel Implementation of Lazy Functional Languages Using Abstract Demand Propagation.*† November 1994 (Gao).

†Available via anonymous ftp from ftp-acaps.cs.mcgill.ca in directory pub/doc/thesis.

5 ACAPS Masters Theses

The following theses have been written by ACAPS members. The supervisor of each thesis is listed in parentheses.

1. Z. Paraskevas. *Code Generation for Dataflow Software Pipelining.* June 1989 (Gao).

2. J. M. Monti. *Interprocessor Communication Supports for a Multiprocessor Dataflow Machine.* March 1991 (Gao).

3. Yue-Bong Wong. *A Petri-Net Model for Loop Scheduling.* November 1991 (Gao).

4. Russell Olsen. *Collective Analysis and Transformation of Loop Clusters.* May 1992 (Gao).

5. Nematollaah Shiri-Varnaamkhaasti. *A Design and Implementation of Unimodular Transformations of Loops.* May 1992 (Gao).

6. Bhama Sridharan. *An Analysis Framework for the McCAT Compiler.*† September 1992 (Hendren).

7. Maryam Emami. *A Practical Interprocedural Alias Analysis for an Optimizing/Parallelizing C Compiler.*† July 1993 (Hendren).

8. Christopher M. Donawa. *The Design and Implementation of a Structured Backend for the McCAT C Compiler.*† March 1994 (Hendren).

9. Chandrika Mukerji. *Register Allocation Using Cyclic Interval Graphs.*† July 1994 (Gao).

10. Ana Marie Erosa. *A Goto-Elimination Method and its Implementation for the McCAT C Compiler.* May 1995 (Hendren).

†Available via anonymous ftp from ftp-acaps.cs.mcgill.ca in directory pub/doc/thesis.