

Curriculum vitae A.P. Willem Böhm

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QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

1974	MSc Mathematics and Computer Science	Technical University Delft, Holland
1974-1978	Researcher	Mathematical Center, Amsterdam, Holland
1984	PhD	University of Utrecht, Holland
1978 - 1984	Lecturer and Research Assistant	University of Utrecht, Holland
1984 - 1989	Lecturer and Research Fellow	University of Manchester, United Kingdom
1990 - 1996	Associate Professor	Colorado State University
1996 - present	Professor	Colorado State University

TEACHING AWARDS

- 2005 CSU College of Natural Science Excellence in Undergraduate Teaching Award
- 2007 CSU Eddy (Liberal Arts and Natural Sciences) Teacher Award
- 2010 CSU Board of Governors Excellence in Undergraduate Teaching Award

SELECTED RESEARCH PUBLICATIONS and PRESENTATIONS

- Doug Hains, Zach Cashero, Mark Ottenberg, Wim Böhm and Sanjay Rajopadhye, *Improving CUDASW++, a Parallelization of Smith-Waterman for CUDA Enabled Devices*, HiComb Workshop, IPDPS 2011.
- Charlie Ross and Wim Böhm, *The Case for Dynamic Execution on Dynamic Hardware*, Short Paper. IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM07), 2007.
- Charlie Ross and Wim Böhm, *A Co-Verification Tool for a High Level Language Compiler for FPGAs*, IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM06), 2006.
- A.P.W. Böhm, *The Power of Streams*, Invited presentation, Reconfigurable Systems Summer Institute, National Center for Supercomputing Applications, UIUC Urbana Champaigne, July 2006.
- B. Draper, R. Beveridge, W. Böhm, C. Ross, and M. Chawathe. *Accelerated Image Processing on FPGAs*, *IEEE Transactions on Image Processing*, Vol. 12, December 2003.
- G. Venkataramani, W. Najjar, F. Kurdahi, N. Bagherzadeh, W. Böhm and J. Hammes. *Automatic Compilation to a Coarse-grained Reconfigurable System-on-Chip*, *ACM Transactions on Embedded Computing Systems*, 2003.
- W. Böhm, J. Hammes, B. Draper, M. Chawathe, C. Ross, R. Rinker, and W. Najjar. *Mapping a Single Assignment Programming Language to Reconfigurable Systems*, *Supercomputing*, 21:117-130, 2002.
- R. Rinker, M. Carter, A. Patel, M. Chawathe, C. Ross, J. Hammes, W. Najjar, W. Böhm, *An Automated Process for Compiling Dataflow Graphs into Reconfigurable Hardware*, *IEEE Transactions on VLSI Systems*, Vol 9, No 1, pp. 130-139, 2001.
- W. Böhm, B. Draper, W. Najjar, J. Hammes, R. Rinker, M. Chawathe, C. Ross, *One-step Compilation of Image Processing Applications to FPGAs*, *IEEE Symposium on Field-Programmable Custom Computing Machines*, May, 2001.
- A.P.W. Böhm, J. Hammes, S. Sur, *On the performance of pure and impure parallel functional programs*, *Parallel Computing Journal*, Vol. 25, no 13-14, pp 1723-1740, 1999.
- J. Hammes, O. Lubeck, and A.P.W. Böhm, *Comparing Id and Haskell in a Monte Carlo Photon Transport Code*, *Journal of Functional Programming*, Vol. 5, Part 3, pp 283-316, 1995.
- S. Sur, A.P.W. Böhm, *Analysis of Non-Strict Functional Implementations of the Dongarra-Sorensen Eigensolver*, *Proc. International Conference on Supercomputing 1994*, pp 412-418, Manchester, UK, 1994.

- A.P.W. Böhm, J.R. Gurd, *Iterative Instructions in the Manchester Dataflow Computer*, IEEE, Transactions on Parallel and Distributed Systems, Vol. 1, No 2, pp. 129-139, 1990.
- A.P.W. Böhm, J. Sargeant, *Code Optimisation for Tagged Token Dataflow Machines*, IEEE Transactions on Computers, Vol 38, No 1, pp. 4-14, 1989.
- J.R. Gurd, A.P.W. Böhm and Y.M. Teo, *Performance Issues in Dataflow Machines*, Future Generation Computer Systems, 3, pp. 285-29, 1987.
- A. de Bruin, A.P.W. Böhm, *The Denotational Semantics of Dynamic Networks of Processes*, ACM Transactions on Programming Languages and Systems, Vol 7, No 4, pp. 656-679, 1985.
- A.S. Tanenbaum, P. Klint, A.P.W. Böhm, *Guidelines for Software Portability*, Software - Practice and Experience, Vol 8, pp. 681-698, 1978.

RESEARCH INTERESTS

High Performance Computing, Accelerators such as FPGAs and GPUs, Compilation of Functional Languages for Parallel Systems, Fine grain parallel algorithms.

SELECTED FUNDING

- S. Pallickara, S. V. Rajopadhye, A.P.W. Böhm *Enabling Scalable and Fault Tolerant Regional Epidemiological Simulations in the Cloud*, DHS - US Department of Homeland Security, \$ 618,464.00, 2010-2013.
- E. Regelson, A.P.W. Böhm *Creating Universal Accessibility of Computer Science Course Material*, Colorado State University, \$ 26,993, 2012.
- S. Pallickara, S. V. Rajopadhye, A.P.W. Böhm *Evaluating the Computational Soundness and Enabling Coarse Grained Parallelization of the NAADSM Epidemiological Simulation Model*, USDA, \$ 86,952, 2009-2010.
- S. V. Rajopadhye, A.P.W. Böhm *GPUs versus Multi-core CPUs*, Hardware donation of two HP Z800 workstations with dual quadcore CPUs and Tesla GPUs, Hewlett Packard, 2009.
- A.P.W. Böhm, *An Interactive Learning System for Discrete Mathematics in the first year Computer Science courses*, Colorado State University, \$ 21,000, 2009.
- S. V. Rajopadhye, A.P.W. Böhm *High Level Programming of High Performance Embedded Computing Systems*, National Science Foundation, *Bringing Research Results into the Undergraduate Curriculum* program, Contract Id: 0306124, \$ 629,926, 2003-2005, extended to 2007.
- W.A. Najjar, A.P.W. Böhm, J.R. Beveridge, B. Draper (CSU); A.C Moorman, P.Humphrey, D.M. Cates (KRI) *Optimized Compilation of Visual Programs for Image Processing on Adaptive Computing Systems*, DARPA Contract F33615-98-C-1319, \$ 1,727,359, 1998 - 2001.
- J.L. Gaudiot (USC), J. Feo (LLNL), W.A. Najjar, A.P.W. Böhm *An Evaluation of High-Performance Functional Computing*, ARPA Contract PO # 691964, \$ 1,159,982, 1995-1997.
- A.P.W. Böhm, W.A. Najjar, *A Quantitative Approach to Hybrid von Neumann - Dataflow Architectures*, National Science Foundation (ref. MIP-9113268), \$ 240,122, 1991-1995.
- A.P.W. Böhm, J.R. Gurd, *Mapping Problem Classes onto Parallel Computing Systems*, Science and Engineering Research Council (ref. GR F 04292), £145,704, 1989 -1991.
- J.R. Gurd, C.C. Kirkham, A.P.W. Böhm, *Assessment and Enhancement of a Dataflow Single-assignment Computing Environment*, Alvey Directorate / Science and Engineering Research Council (ref. GR D 40890 IKBS 069(u)), £182,888, 1986-1989.

SYNERGISTIC ACTIVITIES

Teaching: I created Robot Programming and Games Programming challenge classes, and redesigned the first year Computer Science courses to integrate theory and practice. I organized the CSU ISTeC High School Robot Programming Competition. I used Hadoop (Google/ IBM cluster) to teach Map Reduce in a parallel algorithms class.

Consulting: For about two years I consulted for SRC Inc., experimenting with the design of high performance codes, written in the C dialect MAP-C, running on the SRC MAP (FPGA based) super computers.

Software Projects:

SA-C on Reconfigurable Systems. A large body of software, spanning more than 250,000 lines of code, written by about ten graduate students, consisting of compilers, simulators and viewers. I was the language designer and software team leader.

SISAL to Dataflow. I was part of a team implementing the functional language SISAL, compiling it to dataflow intermediate form, and generating code for a variety of targets.

Functional Numerical Kernels and Applications. Kernels such as FFTs, and Eigensolvers, and complete applications, such as Monte Carlo Particle Transport Codes, were written in a variety of functional programming languages (Id, Haskell, SISAL) to assess their efficiency and expressiveness.

Reviewing: Member of program committees for PACT (Parallel Architectures and Compiler Technology), MPPM (Massively Parallel Programming Models), and Micro, for multiple years.

Reviewer for the Journal of Parallel and Distributed Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Software Engineering, Journal of Systems and Software, The Computer Journal, The Journal of Parallel Computing. University of Monash MSc and PhD reviewer.

AFFILIATIONS

Graduate Advisor: J. van Leeuwen, University of Utrecht, Holland.

Recent Collaborators:

Arvind, Massachusetts Institute of Technology.

J. Hammes, S.R.C. Inc.

P. James Roxby, Walt Disney Inc.

W. A. Najjar, University of California Riverside.

J. L. Gaudiot, University of Southern California.

J. Feo, University of California San Diego.

R. R. Oldehoeft, Los Alamos National Laboratory.

R. Hiromoto, University of Idaho.

Selected CSU Advisees:

Masters:

A VHDL Run Time System for Dataflow Execution on Reconfigurable Systems, 2000, Charlie Ross.

A dataflow graph to VHDL Compiler, 2000, Monica Chawathe.

SA-C to VHDL Compiler Testing, 2001, Aparna Shivaswami.

Design and Software Implementation of the SA-C Abstract Hardware Architecture, 2001, Pankaj Patil.

Scheduling Fixed Point FFT Blocks on FPGAs, 2001, Pramod Cherukumilli.

Encryption Algorithms in SA-C, Madhusudan Kovalmudi, 2003.

A MacroProcessor for the LC-2, Hari Aiyer, 2004.

Cordic Algorithms in SA-C, Rama Chitta, 2004.

Horizontal Loop Unrolling in the SA-C Compiler, Sumanth Kakaraparthi, 2004.

Integration of Reduction Operators in a Compiler for FPGAs, Manju Matha, 2007.

PhD:

Distributed Runtime Support for Task and Data Management, 1993, Matt Haines.

The Spectrum of Thread Implementations, 1995, Bhanu Shankar.

Data Dependence Analysis for Functional Array Construction, 1995, David Garza.

Expressiveness and Efficiency of Declarative Programming Languages, 1995, Sumit Sur.

Compiling SA-C (Single Assignment C) to Reconfigurable Computing Systems, 2000, Jeff Hammes.

Hardware Compilation of Streams and Processes, 2006, Monica Chawathe.

An Abstract Target Architecture for FPGA Compilation, 2006, Charlie Ross.