

Paul Budnik, Ph.D.

Consultant

Mountain Math Software

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Image and Signal Processing Parallel Computing

- Led major projects in image and signal processing
- Creative solutions for difficult problems with quality management through project structure and tools that create transparency
- Extensive technical lead and team management experience with great written and verbal communication skills to customers and all levels of the organization.
- Broad and deep experience with a wide range of programming languages and development environments
- Widely referenced research in parallel computing
- Interest in and work on discrete models for physics and the implications of a discrete universe for the foundations of mathematics

Experience:

Mountain Math Software, Consultant, 1989 - present

Major Projects Led

Designed and developed the ordinal calculator to investigate expanding the ordinal hierarchy beyond what is practical without the aid of a computer. (see www.mtnmath.com/ord). Design and implement a new image processing algorithm based on, but better than, adaptive histogram equalization for Suni Medical Imaging to enhance dental x-rays. Design and develop simulators for MPEG compression chips for Cadence Design Systems. Develop a C compiler (based on GNU code) for DSP Semiconductors' Pine DSP. Design and develop a generic tool for digital signal processing design and development, ObjectProDSP.

Consulting Clients

Suni Medical Imaging, Vilong, Cadence Design Systems, DSP Semiconductors, Clarkspur Design, Octel Communications, Castelle and Zoran

Zoran, 1984 - 1989

Director of Tools Systems, 1988 - 1989

Supervised and contributed to the hardware and software development tools that supported Zoran's family of dedicated DSP VLSI components.

Manager of Software Engineering, 1986 - 1988

Supervised and contributed to the software tools that supported Zoran's family of dedicated DSP VLSI components.

Consultant and DSP Architect, 1984-1986

Designed and developed the complete suite of tools (assembler, simulator and emulator board software interface) for the Zoran Vector Signal Processor.

Tools and Specialized Expertise:

Languages and tools: C++, C, Fortran, Perl, JavaScript, Java, Python, shell scripts, Visual C++, Android SDK, Eclipse, microprocessor and digital signal processor assembly languages.

Operating systems: Linux, Windows, Mac OS X, Solaris.

Specialized technical experience: image and signal processing algorithm and system development and implementation; MPEG chip simulation; graphical user interface design and implementation (Windows, X-Windows on Linux, Mac OS X, wxWidgets); Windows privileged mode programming (added image archiving to USB driver); worked with digital signal processors from Texas Instruments, Zoran, DSP Semiconductors and Clarkspur Design; compiler construction (ported GNU C compiler to a new processor); designed and implemented a partial differential equation application for the pioneering SIMD compute, Illiac IV; compiler development for parallel computing; research in organizing parallel memories.

Education:

B. S. in physics, M. S. and Ph.D. in computer science from the University of Illinois at Urbana-Champaign. Acting Assistant Professor at the University of California at Los Angeles.

Selected Publications and Patent:

Budnik, P., "Emergent Properties of Discretized Wave Equations", *Complex Systems*, Volume **19** Issue 2

Budnik. P., "What is Mathematics About?", *Philosophy of Mathematics Education*, **22** (this paper is also in *Critical Issues in Mathematics Education*, Information Age Publishing, 2009)

Barkan, M., Genusov, A., Granski, M., Budnik, P and Retter, R, U. S. Patent 4802111 on Zoran's Digital Filter Processor

Budnik, P. and Kuck, D. J., "The Organization and Use of Parallel Memories", *IEEE Transactions on Computers*, Volume **C20**, Issue 12 (this paper has been cited over 200 times)