Fast, Errorless CPUs for Better AI and Compute

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Exact Computing: Errorless and Faster

SciSci Research is building the world's first errorless CPU, capable of performing exact arithmetic without rounding error or approximation, to be sold as a hardware add-on for accelerated computing. After $>$ 80 years of floating-point, SciSci's goal is to end the tradeoff between speed and precision with a processor that is more precise, more efficient, and faster than floating-point processors.

Performance Advantages

- *Errorless Compute*: **Perfect-precision** within a large range (e.g., 64 or 128 bits)
- *Fast Compute*: Performing at **4-bit or 8-bit floating-point speeds** with perfect precision in a 64- or 128-bit-range, saving $\sim 10\%$ precision per operation compared to 8-bit floating-point and $\sim 100\%$ precision compared to 4-bit
- *Energy-Efficient, Scalable Compute*: **5× speed** per operation compared to floating-point, **saving $\sim$ 500% energy** per operation *per core*, scalable to peta- or (eventually) exa-scale on less energy and without severe cumulative rounding error

Market

AI-driven data center demand is forecasted to reach $7 trillion USD by 2030, presenting both a colossal addressable market and a supply dilemma. Speed is an issue. Whereas companies such as NVIDIA are chasing scalability via low-precision computing (e.g., 8-bit floating-point), SciSci will deliver the same and even faster speeds without sacrificing precision.

A second compute scaling problem is error. Even small rounding errors accumulate significantly at scale (e.g., 10^{16} operations per second, the current petascale frontier[1]). Perfect-precision accelerated computing, by eliminating floating-point error, can make AI results reproducible and consistent, which is important for applications. It can protect LLM parameters from precision loss (e.g., during post-training quantization), and also provide better quality results to users in sectors where errors cause real economic damage, such as risk estimates in high-frequency trading, cybersecurity defenses against blockchain hacks, and prediction of off-target effects in drug discovery.

How It Works

- *Exact Encodings for Numbers*: The processor uses an alternative to floating-point encodings from modern mathematics (i.e., p-adic fields), which are short in length and can be computed exactly without rounding, and can be split into blocks for 3× parallelization
- *Exact is Faster*: Whereas floating-point addition requires 5 steps (e.g., the exponent, the mantissa, rounding), SciSci's processor requires only 1 step, giving a 5× efficiency gain

About SciSci

SciSci was founded in 2025 by James Douglas Boyd, who is the CEO, CTO, and inventor of the CPU. James is the former CEO of the Wolfram Institute, a research center he co-founded with Stephen Wolfram, for whom he previously worked as a research assistant at Wolfram Research.

[1] Even IEEE double-precision floating-point (i.e., 64-bit), with a rounding error of 10^{-16}, will start accumulating error at higher scales (e.g., 10^{17} or 10^{18} floating-point operations per second (FLOPS)).