

Perry's Résumé - Signals & Real-Time Estimation

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R&D engineer with 30+ years building real-time signal processing and estimation systems that run unattended, in the field, for years. Deep expertise in C++, Python and SIMD; recovering timing and symbol estimates from noisy, multipath channels; and shipping those algorithms into embedded platforms with hard latency and memory budgets. Equally at home at the transducer, in the inner loop, and in the field diagnosing why the lab result didn't survive contact with the plant. (PDF, Text)

Technical Skills

- **Signal Processing:** polyphase filterbanks, FFT & window design, matched filtering, sub-sample arrival-time and symbol-phase estimation, SNR/noise-floor estimation, soft-decision recovery
- **Real-Time Performance:** SIMD (Intel AVX, ARM NEON), multi-threaded lock-free pipelines, cache- and allocation-aware inner loops, sustained multi-Mbps throughput on commodity hardware
- **Languages:** C++ (25+ yrs), Python (15+ yrs), Rust (5+ yrs), C, assembly
- **Embedded Systems:** RTOS, microcontrollers, assembly optimization, hardware bring-up, PCB debug
- **Error Control & Robust Comms:** Reed–Solomon FEC, BCH, fountain codes, protocol design for lossy and partitioned channels
- **Industrial Integration:** EtherNet/IP, Modbus, SCADA, RTU firmware, satellite-linked telemetry
- **DevOps & Infra:** Linux, Docker, CI/CD pipelines, reproducible test harnesses over recorded data

Experience

R&D Consultant - *Dominion R&D Corp.* (Remote, 2009–Present)

Deployed remote sensing, telemetry and automation for critical systems that have run unattended for years at a time.

- Delivered rugged satellite-connected monitoring, comms and video systems across Alberta oilfields; field-serviceable, and diagnosable from 400 km away.
- Developed `ezpwd-reed-solomon`, high-throughput C++/JS/Python Reed–Solomon and BCH codecs, used by aerospace and defence developers globally.
- Created `cppo`, the widely used Python library for industrial EtherNet/IP and CIP protocol parsing; the integration layer between analytics and the PLCs on the plant floor.
- Guide dev teams through algorithm, embedded and distributed systems architecture.
- Actively share research code and papers; author technical articles on signal recovery, consensus, and industrial communications.

Software Engineer - *clearGRID Ltd.* (Kelowna, BC 2017–2022)

Replaced expensive proprietary radio telemetry with commodity SDR hardware, by recovering signals the vendor's receivers discarded as noise.

- Built an end-to-end real-time receiver decoding 64 concurrent channels from a 25 Msps I/Q stream on commodity x86 and ARMv8, sustained, with no dropped samples.
- Designed the polyphase filterbank channelizer and window/DFT chain; hand-optimized the hot paths in AVX and NEON, including packed 12-bit wire-format conversion.
- Estimated sub-sample arrival offsets and per-signal baud rate against a drifting reference clock, with per-channel noise-floor and SNR estimation driving detection thresholds.
- Recovered messages below the noise floor by soft-decision search over the least-confident bits, constrained by learned per-transmitter priors on what the payload could plausibly be.
- Built a recorded-signal regression harness so algorithm changes were measured against real captured field data rather than synthetic benchmarks.

Distributed Systems R&D - *Holo Ltd.* (Kelowna, BC 2018–2020)

Architected & tested prototypes of HoloFuel's novel transaction engine.

- Validated atomic transaction processing under simulated network partitions.
- Contributed R&D to Holochain's agent-centric distributed architecture.

Sr. IT Advisor - *Enbridge Pipelines* (Edmonton, AB 2002–2009)

Reduced the risk profile of a hydrocarbon pipeline control system with a cryptographically secure multi-route communications protocol, still in operation today.

- Built a fault-tolerant Reed–Solomon encoded multi-route protocol for real-time SCADA telemetry over marginal and intermittent links.
- Developed solid-state RTU firmware for continuous 24/7 control; sustained <1 defect per 10K LOC as measured in the field, not in the lab.
- Deployed hundreds of ruggedized units across critical infrastructure sites.

Software Developer - *Hewlett-Packard* (Calgary, AB 1989–1996)

Pioneered a radical re-architecture of a core SCADA automation alarm system component.

- Re-engineered RTAP's core alarm engine with DFA state machines.
- Enabled end-users to configure complex, distributed safety-critical workflows.
- Still deployed in pipeline SCADA systems continent-wide, 30+ years on.

Education

B.Sc. Computer Science - *University of Calgary* (Calgary, AB 1984-1989)