EXPERIENCE

Software engineer | Machine learning engineer @ Recurse Center   2021 & 2024

2024: Built a neural network from scratch. Wrote about the design of deep neural networks. Built / evaluated ML models: CNNs, GANs, transformers. Basic mechanistic interpretability of LLMs for the transformer architecture. Learned Rust. Wrote about Rust memory management. Read Designing Data-Intensive Applications (Kleppmann).

2021: Learned Go. Built a ray tracing engine. Worked through Python for Data and Computer Science - MIT 6.000, Computer System Engineering - MIT 6.033. Read Code: The hidden language of computer hardware and software (Petzold). Translated my research, data science, and scientific computing skills to backend software engineering.

Software engineer | Data engineer @ Lantern   2022 - 2024

Data engineering & analytics - Reduced data storage and processing costs by 50%: Designed and built a streaming data pipeline, migrated a data warehouse. Improved outage recovery times: Instrumented a large, complex code base to emit observability and privacy-respecting usage data. Designed metrics and dashboards to support developer, infrastructure, business, and client services teams' requirements. Optimized for efficient, cost effective querying of the data warehouse.

Backend & Infra - Wrote code for core services. Configured, deployed services to cloud providers. Monitored performance.

Member of a technical team responsible for delivering a distributed service to millions of concurrent users. Worked with Go, Python, Rust, GCP, Docker, Terraform, OpenTelemetry, Superset, Big Query, Honeycomb, Datadog, Tailscale. Participated in hiring and onboarding. Supported internal adherence to data privacy commitments.

Portfolio Manager / Scientific Liaison @ University of Oxford   2019 - 2021

Delivered a $1.2MM longevity bioscience portfolio: scouted, scoped, managed projects. Produced >50 longevity research proposals in under 6 months. Led grant funding process: Developed funding guidelines, award process protocols, engaged expert reviewers, authored summary materials for Advisory Board. Managed a complex mix of advisory board objectives which were often in tension. Drafted original research proposals for sister portfolios under our funding umbrella. Mentored new team members. Enabled exceptional partners to make inroads on drug discovery for longevity medicines. Details: monicaspisar.com/posts/hedging-bets-longevity

COO @ Mineral Deposit Research Unit, University of British Columbia   2013 - 2015

Led operations, finance (budget O($MM)), core team. Co-led strategy for research and training initiatives, sponsorships, fundraising. Upgraded operations with transparent, intuitive systems to support a distributed research team. Board liaison. Resolved friction points between industry expectations and institutional inertia. Planned and executed a unit reorganization to increase impact and operational effectiveness. Designed and delivered training programs. Redesigned MDRU's information systems. Safety and emergency planning for remote international fieldwork expeditions.

Program Manager & Industry Grants Officer @ University of British Columbia   2011 - 2013

Targeting MD/PhDs, delivered a program for cross-disciplinary training and development of entrepreneurial skills. Coincidentally contributed to the founding of a 3D tissue printing startup, now a thriving company: Aspect Biosystems. Led coordination of Industry grants. Negotiated and managed 200+ industry-academia agreements annually, working within the University-Industry Liaison Office and in close coordination with UBC Legal and Finance.

Founder/Director @ Little Stars Child Development Center   2010 - 2014

Founded an early childhood education center. Developed and delivered a bespoke curriculum. Directed operations.

Research engineer | Data scientist @ Kardium (Employee #16)   2008 - 2011

Device delivery guidance - Led deployment imaging for a class III medical device for transcatheter mitral valve repair. Integrated multiple medical imaging modalities to meet requirements for accurate catheter delivery guidance.

Product R&D - Led device performance characterization (computer simulations, lab), preclinical trial design, initial clinical evaluation for a class II device for sternal closure. Product research: observed coronary artery bypass surgeries and cath lab procedures, worked closely with expert clinicians to define specs (performance and UX).

Patents - 8888791, 9700363: Surgical instrument and method for tensioning and securing a flexible suture

Participated in hiring processes, onboarding. The team grew to >30 people during my tenure; we worked on a highly effective consensus model for R&D and hiring decisions.

EDUCATION + RESEARCH TRAINING

Postdoctoral Research Scientist @ Sorbonne University

Led research on high resolution ultrasound imaging of angiogenesis. Computer simulations of small particle dynamics in microscopic blood vessels. Designed and built a microfluidics vascular flow prototype for high resolution ultrasound imaging. Mentored doctoral students.

PhD, Biomedical Engineering - Medical Imaging, University of Michigan

Thesis - Optoacoustic detector arrays for medical imaging applications.

Thesis research - Designed, built, tested a laser-based ultrasound imaging system with novel detection technology. Targeted clinical requirements for front-end miniaturization (catheter delivery) and image quality: stringent sensitivity and resolution specs. Built the optical system and tuning electronics. Wrote custom signal capture, processing, and image reconstruction software. Work focused on subnanometer control of effective optical path length across a synthetic array detector. Final designs achieved a 10x sensitivity increase. Mentored an undergraduate assistant. Participated in weekly research meetings, supported lab research on, e.g., laser-generated microbubbles and histotripsy.

Pre-thesis research - Small scintillation (gamma) camera for breast imaging. Used statistical image reconstruction methods to identify optimal detector configuration. Customized Monte Carlo photon transport simulation software (in C) to include parallel processing. Built and evaluated a prototype gamma camera.

Graduate level courses (select) - MAT: linear algebra, statistics; EECS: digital signal processing and analysis; NERS: physics of medical imaging (nuclear imaging); BME: medical imaging systems (radiography/CT, ultrasound, MRI/fMRI), medical imaging lab*; Neurosci: neurophysiology.

Teaching - BME510 Medical Imaging Lab - TA

BSc, Physics, University of Toronto

Physics specialist courses - classical mechanics, electricity & magnetism, thermal physics, quantum physics, electromagnetic theory, statistical mechanics, condensed matter physics, optics, laser physics, relativistic electrodynamics, nuclear and particle physics, high energy physics; calculus, multivariable calculus, linear algebra, analysis, ordinary differential equations, partial differential equations, complex analysis, statistics; medical imaging.

PEER-REVIEWED PUBLICATIONS   Google Scholar | ResearchGate

PERSONAL BLOG   *samples from https://monicaspisar.com*

Designing neural networks | Building a longevity bioscience portfolio | Picture perfect: AI + medical imaging | OpenTelemetry Collectors for all | Rust: Memory management | Did al do that? | Mainstreaming longevity

SOFTWARE SKILLS

Machine learning & data science: PyTorch, NumPy, SciPy, LangChain, LangFuse, end-to-end ML pipeline development
Data & observability: PostgreSQL, Redis, BigQuery, Rockset, OpenTelemetry, Looker, Honeycomb, Datadog, Grafana
Languages: Python, Go, Rust, SQL, TypeScript/JavaScript | **Frameworks**: React, Node/Next.js, OpenAPI
Infra: Docker, Terraform | **Cloud**: GCP, AWS | **Dev tools**: Git, Bash | **AI code assistants**: Cursor + Claude, GitHub Copilot

SOFTWARE PROJECTS   *samples from https://github.com/msyvr*

Neural network, from scratch | Monte Carlo-optimized agent | OpenTelemetry Collector with custom exporter