MONICA SPISAR, PhD

machine learning / software / data

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TECHNICAL INDIVIDUAL CONTRIBUTOR EXPERIENCE

Software engineer | Machine learning engineer: participant @ **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: censorship circumvention software app @ **Lantern** 2022 - 2024

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.

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.

Research engineer | Data scientist: medical devices @ **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

LEADERSHIP EXPERIENCE

Portfolio Manager / Scientific Liaison: Longevity research @ University of Oxford 2019 - 2021
COO: Industry-focused research unit @ MDRU University of British Columbia 2013 - 2015
Program Manager & Industry Grants Officer: Industry liaison @ University of British Columbia 2011 - 2013

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

PERSONAL PROJECTS & WRITING — *sampled from github.com/msyvr & monicaspisar.com*

Code: Neural network, from scratch | Monte Carlo-optimized agent | OpenTelemetry Collector with custom exporter
Blog: Designing neural networks | OpenTelemetry Collectors for all | Rust: Memory management

EDUCATION + RESEARCH TRAINING

Postdoctoral Research Scientist, Biomedical Imaging Lab, **Sorbonne University**
Computer simulations and microfluidics vascular flow prototyping to evaluate contrast-enhanced medical ultrasound.

PhD, Biomedical Engineering (Medical Imaging), **University of Michigan** **Publications** - Google Scholar, ResearchGate
Thesis: Optoacoustic detector arrays for medical imaging applications.

BSc, Physics, **University of Toronto**