MONICA SPISAR, PhD

machine learning / software engineering / data

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TECHNICAL INDIVIDUAL CONTRIBUTOR EXPERIENCE

Software engineer | Machine learning engineer: participant @ Recurse Center, USA **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, USA **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 - Designed and built a streaming data pipeline, migrated a data warehouse; reduced data storage and processing costs by 50%. Instrumented a large, complex code base to emit observability and privacy-respecting usage data; improved outage recovery times. Created 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), Canada **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, France
Computer simulations and microfluidics vascular flow prototyping to evaluate contrast-enhanced medical ultrasound.

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

BSc, Physics, University of Toronto, Canada