

# Monica Spisar

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## EDUCATION + RESEARCH TRAINING

**Sorbonne Université / Université Pierre et Marie Curie Paris VI** Research Scientist (Postdoc) 2003.09 - 2004.09

Led research on high resolution ultrasound imaging of angiogenesis. Computer simulations of small particle dynamics in microscopic blood vessels. Engineered a microfluidics-based vascular model for high resolution ultrasound imaging.

**University of Michigan** PhD, Biomedical Engineering (Medical Imaging)

Thesis: Optoacoustic detector arrays for medical imaging applications.

2003.08

**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. Strict sensitivity and resolution goals; initially, SOTA sensitivity was underpowered by ~8x. Work focused on subnanometer control of effective optical path length across a synthetic array detector. Built the optical system and tuning electronics. Wrote custom signal capture, processing, and image reconstruction software. Final designs achieved a 10x sensitivity increase.

Mentored an undergraduate assistant. As a member of the Biomedical Ultrasound Lab, participated in weekly research meetings and supported fellow BULLies' 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.

**Publications:** Google Scholar: Monica Spisar

**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.

*\*BME510 Medical Imaging Lab: I was part of the inaugural cohort for this course, and we collaboratively fine tuned lab exercises to prepare the course for official, permanent delivery. I subsequently served as TA.*

**University of Toronto** BSc, Physics

**Physics specialist program:** 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.

## PROFESSIONAL EXPERIENCE: TECHNICAL INDIVIDUAL CONTRIBUTOR

**Recurse Center** Software craftsmanship & upskilling

2021.09 - 2021.12 & 2024.05 - 2024.08

Dramatically improved my software engineering skills in both batches at `the writing residency for programmers`.

2024: Career transition to machine learning, AI safety (mechanistic interpretability), memory-safe languages (Rust).

2021: Career transition to backend engineering. Focused on computer science fundamentals and code craftsmanship.

**Lantern** Software Engineer, Censorship circumvention systems

2022.03 - 2024.05

Rebuilt a data pipeline and migrated a data warehouse, reducing data storage and processing costs by 50%. Designed and built client metrics and ops/dev dashboards to both secure O(\$MM) funding and accelerate complex service recovery (days → hours). Completed sprint tickets to support distributed cloud infrastructure delivering web and mobile apps.

Participated in hiring/interviewing processes; helped to onboard new team members. Monitored internal adherence to our data privacy commitment, supporting engineering and product design teams on related work.

Go, Python, Rust, GCP, Docker, Terraform, Open Telemetry, Superset, Big Query, Honeycomb, Datadog, Tailscale.

**Kardium** Research Engineer (Employee #16), Medical devices 2008.11 - 2011.01  
Transcatheter mitral valve repair: device design, biomedical expert; led deployment guidance imaging; led preclinical trial design. Sternal closure device: led performance characterization (simulations, lab); supported clinical evaluation. Product research: observed coronary artery bypass surgeries, worked with cardiologists and cardiovascular surgeons. Participated in hiring/interview processes and onboarding of new team members. Kardium grew to about 30 people during my tenure, and we worked on a consensus model for all R&D and hiring decisions. It was surprisingly effective!  
Patents: 8888791, 9700363: Surgical instrument and method for tensioning and securing a flexible suture

## PROFESSIONAL EXPERIENCE: EXECUTIVE MANAGEMENT + ENTREPRENEURSHIP

**University of Oxford** Scientific Liaison / Portfolio Manager 2019.02 - 2021.07  
Scouted, funded, managed \$1.2MM longevity portfolio. Worked with PIs to develop >50 longevity-focused research proposals in under 6 months. Managed a complex mix of advisory board objectives. Drafted original research proposals for sister portfolios under our funding umbrella. Details: [monicaspizar.com/posts/hedging-bets-longevity](https://monicaspizar.com/posts/hedging-bets-longevity)

**Mineral Deposit Research Unit** Interim Associate Director 2013.10 - 2015.10  
Led operations, finance (budget O(\$MM)). Led strategy on new research initiatives. Board liaison. Planned and executed a unit reorganization. Collaborated with MDRU members and faculty to design new course offerings. Routinely resolved friction points between industry expectations and institutional inertia. Redesigned MDRU's information systems to lower the barrier for team members to leverage prior MDRU research and coordinate resources. Automated operations with transparent, intuitive systems designed to support a distributed team.

**University of British Columbia** Program Manager & Industry Grants Officer 2011.04 - 2013.06  
Delivered a translational training program. Coincidentally contributed to the founding of a 3D tissue printing startup, now a thriving company - *Aspect Biosystems*. Negotiated and managed 200+ industry-academia agreements annually.

**Little Stars** Founder/CEO 2010.11 - 2014.09  
Founded a progressive early childhood education center. Reached capacity enrollment in under 3 months. Established a licensed facility. Trained qualified ECEs to deliver a progressive program adored by our extended family of families.

**Panne Rizo** CEO 2004.10 - 2011.01  
Acquired a micro-managed business and transformed it into a local retail/wholesale enterprise. Earned coveted Whole Foods supplier slot. Built operational infrastructure and implemented systems to support operational transparency.

**Xoran Technologies** Early stage startup team member 2000.01 - 2000.11  
Small footprint CT scanner. On early team, to seed SBIR award (\$250k/\$1.5M). Contributed to initial investor pitches. Led market research to identify a tractable go-to-market strategy. Still a thriving company.

## SOFTWARE SKILLS

Python, Go, Rust. NumPy, PyTorch. SQL, PostgreSQL, SQLite, Redis, BigQuery, Open Telemetry, Honeycomb, Datadog, Grafana, Prometheus. Superset, Rockset, Looker. Docker. Terraform. Tailscale. GCP, AWS. Git. Bash.

## SOFTWARE PROJECTS (select, see <https://github.com/msyvr>)

agentrix, micrograd-python, ray tracers (Rust, Python), multisource downloader

## POSTS (select, see <https://monicaspizar.com>)

Designing neural networks, Tour de micrograd, Rust memory management, Building a longevity bioscience portfolio, Mainstreaming longevity, AI in medical imaging