JIAO LIN

Computational Scientist / Quantitative Engineer

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PROFESSIONAL SUMMARY

Computational Scientist & Quantitative Architect with 20+ years of experience transforming advanced research into high-impact, scalable computing systems. Proven track record in Quantitative Finance and physics-based simulations, including the design of domain-specific languages (DSLs) and development platform that accelerate model development by 10x. Expert in navigating highly regulated environments—from DOE national laboratories to Tier 1 financial institutions—to deliver robust, production-ready solutions for credit risk modeling and large-scale scientific simulation.

CORE COMPETENCIES

- Quantitative Finance Modeling: Risk Modeling, State-Transition Models
- Distributed Systems: PySpark, AWS, Kubernetes, Large-Scale Pipelines
- Scientific Computing & HPC: Monte Carlo Simulation, MPI, Python, C++, CUDA (numba)
- AI & Computer Vision: CNNs, Remote Sensing, Image Correlation, and Multi-agent LLM systems

PROFESSIONAL EXPERIENCE

Bank of America | *Senior Quantitative Financial Analyst* **2022–Present**

- **DSL Architecture:** Designed and implemented an implementation-agnostic domain-specific language (DSL) for variable transformation, enabling standardized, scalable feature engineering across underlying engines, including both PySpark and Pandas
- **Model Development Framework:** Architected an end-to-end development framework (estimation, implementation, and testing) for state-transition credit risk models, increasing productivity by ~10x
- **Production Deployment:** Partnered with model risk and engineering teams to ensure regulatory-compliant, production-ready model deployment on enterprise data platforms.

Oak Ridge National Laboratory | *Lead Instrument Scientist / Senior Staff* **2015–2022**

- **Strategic Leadership:** Led the initial design of a $30M+ next-generation neutron imaging instrument at the Spallation Neutron Source (STS)
- **Team Management**: Managed a multidisciplinary team spanning research, computing, mechanical design, and systems engineering
- **Research Innovation**: Principal Investigator (PI) for a DOE LDRD project applying super-resolution reconstruction and machine learning to experimental neutron scattering data
- **Software Stewardship**: Created Linux conda recipes for Mantid, a 1M+ LOC C++/Python scientific package

Satelytics Inc. | *Principal Scientist* **2019-2020**

- **ML Innovation**: Invented CNN-based models and machine-learning approaches to extract physical signals (trace-gas concentrations) from satellite imagery using training data generated from physics-based simulations
- **Cloud Engineering**: Built modular remote-sensing pipelines supporting both on-prem and AWS execution

California Institute of Technology | *Computational Scientist* **2005–2015**

- **Scientific Software**: Architected and implemented data reduction, analysis, and simulation tools used in national labs and academic research
- **Algorithmic Impact**: Developed core algorithms and workflows for the COSI-Corr satellite image correlation, supported and co-authored a ***Science*** cover publication

TECHNICAL PROJECTS & INNOVATION

MCVINE Monte Carlo Neutron Simulation Platform

- Architect and lead developer of a C++/Python simulation framework supporting 8 neutron instruments; accelerated performance using CUDA via numba

Agentic Decision-Support System for Counseling

- Designed and implemented a multi-agent LLM system to support structured counseling conversations, emphasizing explainability, guardrails, and risk-aware guidance rather than prescriptive advice

EDUCATION, AWARDS & SKILLS

- **PhD, Materials Science**, California Institute of Technology
- **Awards**: Performance Award, Spallation Neutron Source Second Target Station, ORNL (2021); Significant Event Award, ORNL (2016)
- **Programming:** Python, C++, Java, Fortran, Go
- **HPC/Cloud:** MPI, CUDA, OpenMP, AWS, Kubernetes
- **LLM:** LangGraph / LangChain; local and hosted LLM backends

SUPERVISION & MENTORSHIP

- Supervised postdoctoral fellows and graduate researchers who progressed to national lab scientists and faculty positions.

LEADERSHIP & SERVICE

- Organizer, SNS Second Target Station Computer Science & Math Workshop (2022)
- Lecturer, SNS Instrument Building School (2021)
- Reviewer for multiple peer-reviewed journals including The Journal of Open Source Software, Journal of Applied Crystallography, Transactions on Geoscience and Remote Sensing, Experimental Mechanics, *etc*

PUBLICATIONS

60+ peer-reviewed publications

- Selected publications: https://linjiao.info/publication/
- Full list: https://scholar.google.com/citations?user=tZ2L1qMAAAAJ&hl=en