JIAO LIN

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Computational scientist with 20+ years spanning quantitative finance, computer vision, and scientific computing. Architect of large-scale simulation software, ML-based image analysis pipelines, and a domain-specific language for PySpark-based risk modeling.

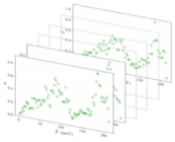
EXPERIENCE

2022 – Present: Senior Quantitative Financial Analyst, Bank of America
2020 – 2022: Lead Instrument Scientist/Senior Staff, Oak Ridge National Lab
2019 – 2020: Principal Scientist, Satelytics Inc
2015 – 2019: Software Scientist, Oak Ridge National Lab
2008 – 2015: Computational Scientist, California Institute of Technology
2005 – 2008: Assistant Scientist, California Institute of Technology
2004 – 2005: Postdoctoral Fellow, California Institute of Technology

EDUCATION

JUNE 2004, PhD, Materials Science, California Institute of Technology
JUNE 1999, Master of Science, Condensed Matter Physics, Chinese Academy of Sciences
JUNE 1996, Bachelor of Science, Physics, Peking University

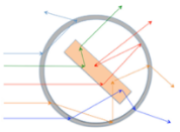
ACHIEVEMENTS



Emerging applications of super resolution imagery techniques in neutron scattering data using regularized optimization

High resolution satellite image correlation helps study glacier erosion law

50,000 lines of C++/python



Monte Carlo neutron ray-tracing simulations for neutron scattering experiments

570,000 lines of C++/python

SKILLS

Computing

- **Programming:** Python, C++, Java, Fortran, Go
- **Data Science**: PySpark, Pandas, NumPy, Keras, Dash/Plotly
- **Scientific Computing**: Monte Carlo Simulations, MPI, CUDA (numba), OpenMP
- **Tools**: Conda, Jenkins, Kubernates, AWS, Linux

Research

- Quantitative Finance
- Computer vision/Satellite imagery
- Neutron scattering / Neutron imaging
- Physics / Materials science

EXAMPLE PROJECTS

https://linjiao.info/software/

Quantitative Finance

- Conceptualized and implemented a **Domain Specific Language** for "Variable Transformation" with PySpark for quantitative risk model development. (link)
- Designed and implemented a model testing tool that increases model development productivity by ~10X for an integrated credit risk model system at BofA

Scientific Computing

- As the Lead Instrument Development Scientist, led a team of research software engineers, mechanical designer and engineer in initial design of a $30M+ neutron imaging instrument at STS, ORNL
- As the PI of a DOE LDRD project, conceptualized two novel methods to apply Super-resolution imagery methods to experimental inelastic neutron spectra, and led the team to implement the methods and demonstrate their applications (link)
- Architected and led the effort to accelerate the MCViNE simulations with CUDA by using numba
- Developed MCViNE, and performed Monte Carlo neutron ray tracing simulations for design of neutron instruments at the Second Target Station of the Spallation Neutron Source, and for design of sample environments including collimators and furnaces. Contributed to all 8 instruments selected for the first phase of the STS project. (link)
- Created and maintained the linux-64 conda recipe for Mantid, a large neutron data reduction C++/python package (1M lines of code), and its system-tests jenkins task.
- Built a web application using dash/plotly for resolution functions of DGS instruments

Computer Vision and Machine Learning

- Developed a python/C++ package, including a semi-global matching algorithm using dynamic programming, for the COSI-Corr project, a satellite image correlation tool. This tool facilitated the computing needed for the publication on the cover of Science Oct 2015. (link)
- Invented an ML model to predict trace-gas concentration from satellite imagery, using simulated training data from atmospheric modeling (link)
- Built a modular remote-sensing imagery framework with local and AWS pipeline execution. (link)
- Created a CT reconstruction workflow tool for CG1D neutron imaging beamline at HFIR and facilitated automatic CT reconstruction (link)

SUPERVISION / MENTORING

- **Dr. Fahima Islam**, Postdoc fellow, "Super-resolution reconstruction for Inelastic Neutron Scattering Spectra from Direct Geometry Chopper Spectrometers". Now ORNL Neutronics Scientist.
- **Ian Lumsden**, "SCADGen: converting MCViNE 3D models to OpenSCAD models", ORNL. Now Graduate Student at Global Computing Lab
- **Dr. Hillary Smith**, Postdoc fellow, "Virtual neutron facilities at SNS", Caltech. Now Associate Professor of Physics at Swarthmore College.

LEADERSHIP & COMMUNITY ENGAGEMENT

ORGANIZER for the Spallation Neutron Source Second Target Station Computer Science and Math Workshop 2022
LECTURER for SNS Instrument Building School, ORNL 2021
REVIEWER for The Journal of Open Source Software, Journal of Applied Crystallography, Transactions on Geoscience and Remote Sensing, Experimental Mechanics, etc.

AWARDS

2021, Performance Award, Spallation Neutron Source Second Target Station, ORNL.
2016, Significant Event Award, Neutron Data Analysis and Visualization Division, ORNL.
2016, Performance Award, Neutron Data Analysis and Visualization Division, ORNL.

PUBLICATIONS

See https://linjiao.info/publication/