

Lijie Ding

Contact: (401)-410-4049, ljding.jobs@gmail.com **Link:** Github, LinkedIn, Google Scholar

Education

Ph.D. (Physics), Brown University 10/2022

Dissertation: Chiral Liquid Crystals on Deformable Surfaces: A Monte Carlo Study

Advisor: Robert A. Pelcovits and Thomas R. Powers

B.Sc. (Applied Physics), University of Science and Technology of China (USTC) 06/2017

Thesis: Irreversible Monte Carlo Algorithms

Advisor: Youjin Deng

Experience

Development and Maintenance of Valuation Models, *Goldman Sachs* 07/2022 - present

- Calibrated pricing models' inputs to mark to market valuation using market data and consensus.
- Covered product-level valuation models of *exotic derivatives*: Bermudan Swaption, CMSBinary etc.
- Developed calibration and valuation models based on SOFR, and expanded scope of sourced data.

Data Analysis for Market Consensus and Inventory Securities, *Goldman Sachs* 07/2022 - present

- Conducted first-order attribution analysis respect to risk factors: IR Basis/Xccy, FX spot.
- Developed analysis tools for tracking risk and valuation of Bermudan Swaption and Cancellable Swap.
- Expanded attribution analysis tool for inventory securities' price variance from market implied valuation.

Monte Carlo Simulation of Chiral Fluid Membrane, *Brown University* 05/2018 - 08/2023

- Developed *quantitative modeling* frameworks for colloidal membrane using *Monte Carlo method*.
- Executed off-lattice dynamical triangulation simulation developed in *C++* on *high performance computing cluster* managed by *Slurm* using *Bash Script*.
- Developed *statistical analysis*, *uncertainty analysis* method and *data visualization* using *Python*.

Controlled Amplification of DNA Brownian Motion, *Brown University* 10/2017 - 11/2020

- Solved overdamped *Brownian Motion*, Langevin dynamics, for λ DNA under electric stochastic noise.
- Developed *image analysis* and tracking software using *Python* for fluorescent λ DNA in nanoslit.
- Developed *time series analysis* and error analysis, *bootstrapping*, for λ DNA *Brownian motion* trajectory.

Irreversible Monte Carlo (MC) Algorithms, *USTC* 06/2015 - 11/2017

- Investigated and designed irreversible *MC algorithms*: Event-Chain Parallel Tempering and Lifted Worm, achieved up to 25% and 14,000% efficiency improvement, respectively.
- Developed and implemented these algorithms using *object-oriented programming* with *C++*.
- Analyzed and benchmarked MC sampling data using advanced *data analysis*, *Sokal's auto-windowing method*, carried out *data visualization* for publication using *Python*.

Skills/Knowledge

Software/Programming: Excel, C++, Python, Bash, Mathematica, Matlab.

Technical: Monte Carlo Method, Time Series Analysis, Statistical Data Analysis, Algorithm Development

Finance: Interest Rate Derivatives, Stochastic Calculus, Mathematical/Quantitative Finance

Publications

Monte Carlo: Ding2023SoftMatter, Ding2021SoftMatter, Ding2020PRE, Elçi2018PRE

Brownian Motion: Lamah2020PRApplied

Others: Khan2019Flex.PE, Wei2016Arxiv