

# Lijie Ding

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## 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

<b>Development and Maintenance of Valuation Models, <i>Goldman Sachs</i></b>	07/2022 - present
<ul style="list-style-type: none"> <li>Calibrated pricing models' inputs to mark to market valuation using market data and consensus.</li> <li>Covered product-level valuation models of <i>exotic derivatives</i>: Bermudan Swaption, CMSBinary etc.</li> <li>Developed calibration and valuation models based on SOFR, and expanded scope of sourced data.</li> </ul>	
<b>Data Analysis for Market Consensus and Inventory Securities, <i>Goldman Sachs</i></b>	07/2022 - present
<ul style="list-style-type: none"> <li>Conducted first-order attribution analysis respect to risk factors: IR Basis/Xccy, FX spot.</li> <li>Developed analysis tools for tracking risk and valuation of Bermudan Swaption and Cancellable Swap.</li> <li>Expanded attribution analysis tool for inventory securities' price variance from market implied valuation.</li> </ul>	
<b>Monte Carlo Simulation of Chiral Fluid Membrane, <i>Brown University</i></b>	05/2018 - 08/2023
<ul style="list-style-type: none"> <li>Developed <i>quantitative modeling</i> frameworks for colloidal membrane using <i>Monte Carlo method</i>.</li> <li>Executed off-lattice dynamical triangulation simulation developed in <i>C++</i> on <i>high performance computing cluster</i> managed by <i>Slurm</i> using <i>Bash Script</i>.</li> <li>Developed <i>statistical analysis, uncertainty analysis</i> method and <i>data visualization</i> using <i>Python</i>.</li> </ul>	
<b>Controlled Amplification of DNA Brownian Motion, <i>Brown University</i></b>	10/2017 - 11/2020
<ul style="list-style-type: none"> <li>Solved overdamped <i>Brownian Motion</i>, Langevin dynamics, for <math>\lambda</math>DNA under electric stochastic noise.</li> <li>Developed <i>image analysis</i> and tracking software using <i>Python</i> for fluorescent <math>\lambda</math>DNA in nanoslit.</li> <li>Developed <i>time series analysis</i> and error analysis, <i>bootstrapping</i>, for <math>\lambda</math>DNA <i>Brownian motion</i> trajectory.</li> </ul>	
<b>Irreversible Monte Carlo (MC) Algorithms, <i>USTC</i></b>	06/2015 - 11/2017
<ul style="list-style-type: none"> <li>Investigated and designed irreversible <i>MC algorithms</i>: Event-Chain Parallel Tempering and Lifted Worm, achieved up to 25% and 14,000% efficiency improvement, respectively.</li> <li>Developed and implemented these algorithms using <i>object-oriented programming</i> with <i>C++</i>.</li> <li>Analyzed and benchmarked MC sampling data using advanced <i>data analysis, Sokal's auto-windowing method</i>, carried out <i>data visualization</i> for publication using <i>Python</i>.</li> </ul>	

## 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:** Lameh2020PRApplied

**Others:** Khan2019Flex.PE, Wei2016Arxiv