Monte Carlo methods and sampling for computing:

EXAM LIST OF PROGRAMMING PROJECTS AND PUBLICATIONS FOR SEMINARS

PROGRAMMING PROJECTS:

1) ~~Implementation of a Poisson-disk sampling algorithm and analysis of average and variance using simple Monte-Carlo problems.~~
2) Deep Learning and Monte-Carlo: generating PDF using deep learning/reinforcement learning using a visual computing framework. This project may lead to a publication.
3) ~~Implementation of Monte-Carlo for games such as chess or checkers.~~
4) Pathtracer on the GPU.
5) Physics simulations. For example, computing the PDF or scattering function of particles in clouds using weather models.
6) Exploring Rank1 sampling for QMC. This project may lead to a publication.

PUBLICATIONS:

1) On Solving Singular Diffusion Equations With Monte Carlo Methods: https://ieeexplore.ieee.org/document/5530410/
2) Why Quasi-Monte Carlo is Better Than Monte Carlo or Latin Hypercube Sampling for Statistical Circuit Analysis: https://ieeexplore.ieee.org/document/5605333/
3) The Square Root Rule for Adaptive Importance Sampling: https://doi.org/10.1145/3350426
4) ~~Infinitely Imbalanced Logistic Regression: https://dl.acm.org/doi/10.5555/1314498.1314525~~
5) ~~Hearthstone AI: Oops to Well Played: https://dl.acm.org/doi/10.1145/3299815.3314461~~
6) The grand challenge of computer Go: Monte Carlo tree search and extensions: https://dl.acm.org/doi/10.1145/2093548.2093574
7) Likelihood ratio gradient estimation for stochastic systems: https://doi.org/10.1145/84537.84552
8) Estimating the Spinning Reserve Requirements in Systems With Significant Wind Power Generation Penetration: https://ieeexplore.ieee.org/document/4682642/
9) Stochastic program optimization: https://doi.org/10.1145/2863701
10) Geometric tools for exploring manifolds of light transport paths: https://doi.org/10.1145/2823402
11) Variance with alternative scramblings of digital nets: https://doi.org/10.1145/945511.945518
12) A Survey of Monte Carlo Tree Search Methods: https://ieeexplore.ieee.org/document/6145622/
13) A simple method for generating gamma variables: https://doi.org/10.1145/358407.358414
14) Efficient Nash equilibrium approximation through Monte Carlo counterfactual regret minimization: https://dl.acm.org/doi/10.5555/2343776.2343816
15) Rare events, splitting, and quasi-Monte Carlo: https://doi.org/10.1145/1225275.1225280

16) Real-Time Price-Based Demand Response Management for Residential Appliances via Stochastic Optimization and Robust Optimization: https://ieeexplore.ieee.org/document/6311454/
17) Monte-Carlo Sure: A Black-Box Optimization of Regularization Parameters for General Denoising Algorithms: https://ieeexplore.ieee.org/document/4598837/
18) Data assimilation using sequential monte carlo methods in wildfire spread simulation: https://doi.org/10.1145/2379810.2379816
19) Monte Carlo Methods for Value-at-Risk and Conditional Value-at-Risk: A Review: https://doi.org/10.1145/2661631
20) Latin supercube sampling for very high-dimensional simulations: https://doi.org/10.1145/272991.273010
21) Variable-sample methods for stochastic optimization: https://doi.org/10.1145/858481.858483
22) Applying Monte Carlo simulation to biomedical literature to approximate genetic network: https://doi.org/10.1109/TCBB.2015.2481399
23) Green Simulation with Database Monte Carlo: https://doi.org/10.1145/3429336
24) Anisotropic diffusion for Monte Carlo noise reduction: https://doi.org/10.1145/318009.318015
25) Metropolis Light Transport for Participating Media: https://dl.acm.org/doi/10.5555/647652.732117
26) High-Performance Quasi-Monte Carlo Financial Simulation: FPGA vs. GPP vs. GPU: https://doi.org/10.1145/1862648.1862656
27) Monte Carlo Beam Search: https://ieeexplore.ieee.org/document/6169183
28) Monte Carlo modeling of light propagation in highly scattering tissues. I. Model predictions and comparison with diffusion theory: https://ieeexplore.ieee.org/document/1173624
29) On Monte Carlo tree search and reinforcement learning: https://dl.acm.org/doi/10.5555/3207692.3207712
30) Fast monte-carlo algorithms for finding low-rank approximations: https://doi.org/10.1145/1039488.1039494
31) Monte Carlo & Quasi-Monte Carlo approach in option pricing: https://ieeexplore.ieee.org/document/6268822
32) The No-U-turn sampler: adaptively setting path lengths in Hamiltonian Monte Carlo: https://dl.acm.org/doi/10.5555/2627435.2638586