

| | | | | |
|------------|----------------------------|--------------------|-------------------|----------------|
| My Desktop | Prepare & Submit Proposals | Awards & Reporting | Manage Financials | Administration |
|------------|----------------------------|--------------------|-------------------|----------------|

Proposal Review 6 : 2152988

[Back to Proposal](#)

| | |
|-------------------------|--|
| Agency Name: | National Science Foundation |
| Agency Tracking Number: | 2152988 |
| Organization: | |
| NSF Program: | CDS&E-MSS |
| PI/PD: | Hickernell, Fred |
| Application Title: | Collaborative Research: Quasi-Monte Carlo for Efficient Simulation |
| Rating: | Good |

Review

Summary

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

Overview of Project: This project uses Quasi Monte Carlo as a better and faster converging alternative to Monte Carlo based on iid sampling. It will develop a Python library to implement QMC. Some methodological developments and theoretical results are also proposed.

Intellectual Merits (IM):

Strengths of IM: The use of low discrepancy (LD) sampling is a valuable tool to improve Monte Carlo performance. The proposal does a good job of tying the proposed QMCPy software to the theory of QMC sampling. The proponents suggest good ways to use their methods within the context of big data, machine learning methods such as stochastic gradient descent and stochastic gradient boosting. They also present QMC as a quicker alternative to time-consuming MCMC methods.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

Strengths of BI: The proponents make a strong effort to reach out to underrepresented minorities.

Weaknesses of BI: Much of the Broader Impacts sections is framed in terms of the research's impact on quasi-Monte Carlo (QMC) researchers and the QMC community. I'm sure it will be influential on them, but I think this is more of a narrow impact than a broad impact. There is not much evidence presented about how this research will benefit society as a whole.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

Additional Solicitation-Specific Criteria: The research is clearly related to improving computing methods. It could be beneficial in big data analysis. The emphasis on speed of algorithms and use of multi-core CPUs is excellent. The plan to develop Python software is very good.

Summary Statement

NSF Prior Support: PI Hickernell was supported by an NSF grant to study Adaptive Algorithms for Approximation and Integration. PI Mak is on an NSF-supported grant that is currently underway to study X-Ion Collisions

Results of NSF Prior Support: There was a good number of articles and theses produced thanks in part to the grant of PI Hickernell. There was a research conference, research program and various software tools developed thanks to the NSF support. Early returns from the collaborative grant that PI Mak is involved in appear promising.

Data Management Plan: The Data Management Plan looks excellent.

Post-Doctoral Mentoring Plan: N/A

Recommendation and Rationale: This proposal is worthy of support. The researchers are experts in Quasi Monte Carlo and appear very capable of achieving their aims. The tie-in to the program solicitation is strong as well. The main weakness I see is that I see this research having more of a narrow impact on a set of specialists, rather than a broad impact on society.

Relative Ranking of this Proposal among those you Reviewed: 5 out of 9



About Services
[Account Management](#)
[Award Cash Management Service \(ACMS\)](#)
[Notifications & Requests](#)
[Project Reports](#)
[Proposal Status](#)
[Public Access](#)

NSF Award Highlights
[Research Spending & Results](#)

Contact
[Contact Help Desk](#)



News & Discoveries
[News](#)
[Discoveries](#)
[Multimedia Gallery](#)

Funding & Awards
[Recently Announced Funding Opportunities](#)
[Upcoming Funding Opportunity Due Dates](#)
[A-Z Index of Funding Opportunities](#)
[Find Funding](#)
[Award Search](#)
[Proposal & Award Policies & Procedures Guide \(PAPPG\)](#)

Publications & About NSF
[Publications](#)
[About the National Science Foundation](#)
[Careers](#)
[Staff Directory](#)

[Feedback](#)

    [See all NSF social media](#)