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# Proposal: 2054560

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## Agency

Agency Name: National Science Foundation

## Application

Agency Tracking Number: **2054560**

Project Title: Independence Posets

Requested Amount: \$387,707

Received Date: 09/22/2020

PI/PD: Nathan Williams

Authorized Representative: Krenare A Skivjani

Submitting Institution: University of Texas at Dallas

## Program

Program Title: Combinatorics

Program Code: 7970

Funding Opportunity Number: PD 18-7970

Division/Area of Science: Division Of Mathematical Sciences

Program Contact Name: Stefaan De Winter

Program Contact Phone: (703) 292-2599

Program Contact Email: [sgdewint@nsf.gov](mailto:sgdewint@nsf.gov)

## Application Status History

Status	Status Date
Declined	03/19/2021

### Cognizant Program Officer Comments

Dear Professor Williams,

The evaluation of your proposal in the Combinatorics program has been finalized and I regretfully will be recommending your proposal for declination.

Although a strong proposal, it mostly suffered from comparison to other proposals in this year's very tough competition.

Stefaan De Winter

These comments are the review analysis I prepared in support of my recommendation for this proposal, with information deleted that is purely administrative or that might identify reviewers or investigators who are not involved in this proposal.

#### Review Analysis

Principal Investigator: Williams, Nathan F.

Proposal Number: DMS 2054560

Institution: University of Texas at Dallas

Title: Independence Posets

This proposal was considered by one of two virtual panels on algebraic and geometric combinatorics and related areas. The panel consisted of 6 members whose research specialties covered the aforementioned areas. The panel was conducted and observed by NSF program officers from the Probability, Combinatorics and Foundations programs.

Each proposal was assigned to three or more panelists for review before the panel met, and in some cases additional panelists contributed reviews while the panel was under way. The reviews formed the starting point for a panel discussion in which other panelists in addition to the three reviewers participated. Comparisons between proposals took place in these discussions and are reflected in the panel summary. Both intellectual merit and broader impacts were taken into account by the panel in their placement of a proposal.

The panel sorted the proposals under consideration into a ranked set of equivalence classes that informs the NSF of the panel's assessment of priority for funding within this competition. In some cases additional reviews from other specialists and/or panels were obtained.

DMS program officers asked the panel to sort proposals into three groups (Highly Recommended for Funding, Recommended for Funding if Possible, Not Recommended for Funding) and to rank the Recommended for Funding if Possible group in detail. Historical funding rates and our estimates of the funds available led us set the sizes of the appropriate groups to be 10%, 30% and 60% of the proposals submitted. Most of the proposals placed by the panel in the Not Recommended for Funding category will be recommended for declination. Many of the Recommended for Funding if Possible category proposals will also be recommended for declination.

This is a proposal in combinatorics. More specifically a study of generalizations of the distributive lattice of order ideals of a poset is proposed.

Three panel reviewers gave this project ratings of G, E/V, and V. Panelists agreed that the PI has a very strong publication record in the proposed area of study, that overall a good set of problems was proposed, and that the connections to other areas of math were making the proposal more interesting. On the other hand, there was a general criticism that the definition of independence posets, which were introduced by the PI, was not illustrated by a sufficiently complicated and illuminating example. The consensus was that such example could significantly help in convincing the panel of the importance of these objects. Another comment was that several of the most important projects proposed by the PI are joint with a senior researcher, and the proposal did not sufficiently clearly indicate what the role of the PI is in these collaborations. Despite these criticisms there was a consensus this proposal had very good intellectual merit.

The broader impact aspects of the proposal were viewed as strong, especially for someone at the PI's career stage. The PI has already a track-record of mentoring both undergraduate and graduate students (and will clearly continue this work), is actively involved in conference organization as well as in editorial work.

The panel concurred that this a strong proposal that nevertheless also exhibited some weaknesses in the intellectual merit. Taking into account the above described comments, as well as the competition with many strong proposals, the panel placed the proposal near the bottom of the "Recommended for Funding if Possible" category. I concur with the placement of this proposal.

Due to budgetary and performance pressure the program officers of the Probability, Combinatorics and Foundations mega-program met to have a preliminary discussion on the proposals of the three programs ranked in the Recommended for Funding if Possible/Competitive category that could not be reached in the first round of funding. The goal of the meeting was to identify those proposals that would be declined at this stage and those that would be kept for further consideration. Program officers agreed to recommend declination of this proposal. Therefore I recommend this proposal for declination.

Recommendation: Declination

Stefaan De Winter  
 Program Director  
 Probability, Combinatorics and Foundations

Review Information

*Please note: The Sponsored Projects Office (or equivalent) at the submitting organization is NOT given the capability to read the below review information.*

Panel Summary

Panel Summary	Release Date
Panel Summary #1	03/18/2021

Proposal Review [Summary of All Reviews](#)

Review	Release Date
Proposal Review #3	03/18/2021
Proposal Review #2	03/18/2021
Proposal Review #1	03/18/2021

Context Statement

Probability, Combinatorics, and Foundations mega-Program  
 Proposal Review Context Statement for Fiscal Year 2021

In 2021 the Division of Mathematical Sciences' mega-program in Probability, Combinatorics, and Foundations (PCF) received almost 200 research proposals; approximately 70 in Probability, 90 in Combinatorics and 35 in Foundations. In addition, all three programs received a few conference proposals (most of them were withdrawn due to cancellations or postponement) and some supplements request. Most of these proposals were reviewed by one or more of the six panels run by the mega-program; three in Combinatorics, two in Probability, and one in the Foundations program. Some proposals were evaluated by panels in other programs (within the division), and a number of proposals submitted to other programs in DMS, were reviewed by one of the PCF panels. Of the remainder, the CAREER, FRGMS, and RTG proposals were reviewed by division-wide panels, and the conference and supplement proposals were reviewed internally. This year, the PCF mega-program expects to recommend support for less than one-third of competing proposals. A small number of submissions were reviewed exclusively by mail.

In the case of a panel review, typically three members of the panel submitted independent reviews prior to the panel's discussion of the proposal. A

fourth panelist then wrote a summary. Sometimes, a proposal was reviewed by more than one panel or a combination of panel and mail reviews. Copies of all reviews used in the decision-making process are made available to the PI in FastLane.

Recommendations for particular proposals are often difficult to make and factors other than reviewers' comments and ratings enter into them. Appropriate balance among subfields, between new investigators and those previously supported, contribution to initiatives and interdisciplinary efforts, effect on education and human resource development, the total amount of funds available, and NSF policies are other important factors taken into consideration. Sometimes, revised versions of proposals declined one year are awarded the following year, and often research that has been supported for multiple funding cycles is declined as other, more competitive, proposals enter the competition.

Whereas reviewers' ratings are taken into consideration, the final recommendation is not based on a simple average of the ratings, and the merit of each proposal is based on the content of the reviews and the panel summary or panel summaries. Among other things, program directors look for reviewers' perspectives on the intellectual merit and broader impacts of the proposed research. The comments of each reviewer are considered in the context of other reviews written by the same reviewer. In other words, every attempt is made to develop a clear picture of each proposal's strengths and likely impact.

Among other things that reviewers look for in a successful proposal are the formulation of a problem or problems and an approach to their solution, clear exposition in the summary and project description, a conveyed sense that the research can be accomplished, and a vision of what the completion of the research might mean. To facilitate the evaluation process, proposals need to be written with the reviewer in mind, so that the importance of the proposed activity can be readily understood in a broad mathematical context.

The decision to fund a proposal is usually accompanied by high ratings, although sometimes proposals in risky new areas or proposals having potentially transformative ideas are funded even when they are not given the highest marks. Many meritorious proposals will not be recommended for awards. A decision to decline or to award a proposal should not be construed as a statement by either the NSF or by the program about the absolute quality of the proposed research. Taken collectively, the funded proposals present a balance across the active and essential areas of the discipline and are not identified by a simple ordering of proposals.

FY21 Program Directors in PCF,

Tomek Bartoszynski, [tbartosz@nsf.gov](mailto:tbartosz@nsf.gov)

Stefaan De Winter, [sgdewint@nsf.gov](mailto:sgdewint@nsf.gov)

Pawel Hitczenko, [phitczen@nsg.gov](mailto:phitczen@nsg.gov)



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