

## 2. PROJECT SUMMARY

**Overview.** The RTG in Combinatorics and Algebra will continue a highly successful research training program at the University of Minnesota. There will be five co-PIs, consisting of three in combinatorics from the previous RTG (Gregg Musiker, Pavlo Pylyavskyy, Vic Reiner), and two newer faculty in algebraic disciplines intimately connected with combinatorics (Christine Berkesch Zamaere, Ben Brubaker).

**Intellectual merit.** The Minnesota department is known as a center for combinatorics connected with other mathematical areas, such as algebra, topology and geometry. Time and again, the five co-PIs have found that the many undergraduates, PhD students and postdocs with whom they work require broad training in modern areas of mathematics, including many topics crucial to all of our research, such as algebraic geometry, commutative algebra, number theory, mathematical physics, representation theory, and topology.

In addition to continuing the most successful features of our current program, such as the strong (and growing) summer REU, this proposal highlights new initiatives, such as a high-profile Open Problems conference *Combinatorics and Algebra 2020*, a first-time hosting of the EDGE summer program for enhancing diversity in graduate education, and more joint seminars between our groups.

Throughout the proposal, effort is taken to make clear the lessons learned from the group's previous RTG experience.

**Broader impacts.** Broader impacts within the RTG will focus on

- using our ever-growing REU program to continue training undergraduates in research, while training grad students and postdocs in the tricky art of research mentorship,
- embarking on a stronger partnership with established minority recruitment resources, such as hosting the EDGE summer program at the Univ. of Minnesota and providing mentors to Math Alliance,
- running the aforementioned Open Problems conference, focussing on talks both by established leaders and rising stars, with an associated published volume of surveys, and delineating the next challenges to be tackled in our subjects,
- continuing to expand outreach to our regional neighbor institutions, and serving our local talented youth by providing enrichment courses to the Univ. of Minnesota Talented Youth Math Program (UMTYMP).