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Chancellor Pamela Shockley-Zalabak
University of Colorado Colorado Springs
1420 Austin Bluffs Parkway
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Dear Chancellor Shokley-Zalabak,

It is a pleasure to write to you about Professor Alexander Soifer, in connection with his nomination for a Distinguished Professorship. At the outset I should stress that although I have been in frequent touch with Prof. Soifer for more than 20 years, we have never met. Hence my evaluation will mostly concern his research and writing activities.

Soifer is a remarkably multitalented person. Besides mathematics research and education, he is an accomplished historian of 20th century mathematics, and an informed critic of contemporary films. In the remaining part of this letter I shall comment on all these aspects except the last, for which my knowledge is not sufficient.

Soifer mathematical research and writing centers on combinatorics and combinatorial geometry. On topics in these areas Soifer wrote extensively, both in the form of research articles and in five monographs. Among the latter, several have been published (in second edition) by Springer, the most prestigious publisher of mathematical literature. The high quality of Soifer's book is best expressed by quoting from the opinions of reviewers in *Mathematical Reviews* and *Zentralblatt für Mathematik*:

[This] reviewer highly recommends this book to everybody: mathematicians and nonmathematicians, students and first rank specialists. They will all enjoy the clear and simple mathematical style of the book.

The beautiful and unique *Mathematical coloring book* of Alexander Soifer is another case of "good mathematics", containing a lot of similar examples ... and presenting mathematics as both a science and an art.

This reviewer warmly recommends this book as an introduction to problem solving and the construction of proofs.

[T]here is much to recommend this book, both for mathematicians and for those who wish to learn more about mathematicians and their subject.

Similarly positive opinions are expressed by reviewers of Soifer's papers:

[T]his paper makes a jolly good read.

The proof is indeed quite beautiful and worth reading.

The MathSciNet of the American Mathematical Society lists 77 citations for Soifer's papers, by 67 different authors.

Many of Soifer's mathematical works tackle open problems concerning combinatorial questions of coloring points or sets, or of packing or covering of sets into/by other sets. In most cases, he provides not only solutions, but elaborates on the history of the problems, describes in details the methodology of solving them, and presents additional questions that may lead readers to try their hand at solving them. This often leads to advances, by readers or Soifer himself. Frequently, one of the characteristics of Soifer's writings is that the problems considered can be formulated in a very simple manner and their solutions do not require very advanced mathematics. However, they do require sophisticated reasoning based on a thorough understanding of the question.

Several of Soifer's papers deal, in particular, with the still unsolved problem of determining the chromatic number of the plane, that is, the minimal number of color classes required if no two points of the same color are at unit distance. Besides contributing to variants of this problem, Soifer was the first to point out that the answer may depend of deep properties of set-theory. This is the first example of a specific problem which has different numerical answers in different axiom systems of the theory of sets.

Soifer's historical research includes the groundbreaking studies concerning the famous mathematician Bartel Leendert van der Waerden, regarding both one of his very well-known results, and his role and activities during World War 2.

Another way of measuring the influence of Soifer's research is by considering the list of coauthors of his research papers. This includes such world famous mathematicians as Vladimir Boltyanski, John Horton Conway, Paul Erdős, and Saharon Shelah.

Besides the pedagogical aspects of most of his publications, it is necessary to highlight two specific activities of Soifer's that greatly benefited the mathematical community (and continue so at this time):

For more than twenty years, Soifer has been indefatigable in organizing the "Colorado Mathematical Olympiad" that was (and is) of immense benefit to

mathematical education in Colorado. The effort that was needed includes collecting (and often originating) the problems for the Olympiad, supervising the grading of the huge number of answers, and sometimes overcoming serious obstacles.

Again for more than twenty years, Soifer has single-handedly edited and published a mathematical quarterly journal (“Geombinatorics” – so named to stress Soifer’s two abiding favorite topics, geometry and combinatorics). The authors of articles in this journal included some well-known names but also authors who published in Geombinatorics their first papers. The articles in Geombinatorics are listed in both Mathematical Reviews and Zentralblatt für Mathematik.

The educational and pedagogical aspects of Soifer’s writings (and the Olympiad and Geombinatorics) are only a part of his more wide-ranging efforts of furthering mathematical education here and abroad. For this activity Soifer received much recognition and many awards. He was also invited to many places (nationally and internationally) to give talks, receive awards, and help organize educational efforts.

The above is only a pale image of Soifer’s work and influence on mathematics and mathematical education. However, I hope that it is sufficient to explain my deep admiration for him and his activities and achievements, and justify my enthusiastic recommendation that he be elevated to the rank of Distinguished Professor.

Sincerely,

Branko Grünbaum