SIAM Activity Group on Discrete Mathematics
Charter Renewal Application

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on Discrete Mathematics. The SIAG/DM was originally formed under the aegis of SIAM on July 19, 1984 by the SIAM Council and July 20, 1984 by the SIAM Board of Trustees. Its initial operating period began January 1, 1985 and ended December 31, 1987. Its charter has been renewed by the council and board twelve times thereafter.

This SIAG had 440 members and, of those, 249 were non-students as of March 31, 2020.

According to its Rules of Procedure:

It is the purpose of the SIAM Activity Group on Discrete Mathematics to foster research in discrete mathematics and the development of its applications, and to bring together and stimulate interaction between the various and diverse communities of mathematical scientists such as those who specialize in graph theory, combinatorics, cryptography, coding theory, theoretical computer science, including algorithms, complexity, communications, mathematical programming and operations research. Within the framework of SIAM, the SIAG will conduct activities that implement its purposes.

The SIAG on Discrete Mathematics will organize activities in discrete mathematics. The SIAG is expected to:

1)   Organize minisymposia at the SIAM Annual Meeting on years when there is no SIAG conference.

2)   Organize a track of at least six minisymposia at the SIAM Annual Meeting at least once every seven years. The VP for Programs and the VP at Large will coordinate the scheduling with the SIAG chairs.

Other activities can include:

3)   Organize a biennial SIAM Conference on Discrete Mathematics. The SIAG will consider dovetailing specialized workshops and conferences with the SIAM Annual meeting or other SIAG conferences. The chair of the conference organizing committee shall be either the program director or the chairperson of the SIAG or their designee. The organizing committee must be approved by the VP for Programs at least 18 months before the conference.

4)   With the approval of the SIAM Program Committee, the SIAG may organize special sessions at SIAM meetings, and conduct special one- or two-day meetings immediately before or after a regular SIAM meeting. Other SIAG meetings may be organized only with the approval of the SIAM president and vice president for programs.

SIAG meetings, workshops, and conferences may be organized only with the approval of the SIAM president and the SIAM vice president for programs.

The SIAG has complemented SIAM's activities and supported its proposed functions. The answers to the questions below indicate how this was accomplished and what the officers propose as the future directions for the SIAG.

List all current officers of the activity group (including advisory board, if relevant).

Chair: Bojan Mohar
Vice Chair: Blair Sullivan
Program Director: C. Seshadhri
Secretary: Richard Brewster

1.   How is the field covered by the activity group doing? Is it growing, is the focus shifting? What have been the significant advances over the last two years?

The area of Discrete Mathematics is strong and gaining in its impact on other fields of mathematics, theoretical computer science, bioinformatics, theoretical physics, social sciences and others. It is also used in industrial mathematics and IT through software development. Powerful new methods are developed, and new results find applications within the mentioned areas.

2.   How is the activity group doing? Is it remaining vibrant? Is the size of the SIAG stable or increasing? How is the SIAG keeping up with the changes in the field? How are the broader interests of SIAM reflected in the activities of the SIAG?

The activity group is predominantly academic in membership and in research goals, but this is natural given that new theoretical tools and methods are needed. The size of the SIAG is stable. We have seen development of probabilistic methods and lately tools for dealing with large graphs (regularity lemma and graph limits) and with large data. The activity is extremely vibrant and applied and industrial sides are still to implement all new results developed in the last few years.

3.   Please list conferences/workshops the activity group has sponsored or co-sponsored over the past two years, and give a brief (one sentence or phrase) indication of the success or problems with each.

The main conferences/workshops the activity group has sponsored or co-sponsored over the past two years are:
- *SIAM DM 2018 (Denver, June 2018), about 330 participants.*
- *SODA 2018 (New Orleans, January 2018), co-located with two other SIAM sponsored conferences ANELEX18 and ANALCO18.*
- *ACM-SIAM Symposium on Discrete Algorithms (SODA19), January 6-9, 2019, San Diego, CA. Three additional meetings, Algorithm Engineering and Experiments (ALENEX19), Analytic Algorithmics and Combinatorics (ANALCO19), and Symposium on Simplicity in Algorithms (SOSA19) took place at the same location and held sessions during the SODA conference.*
- *ACM-SIAM Symposium on Discrete Algorithms (SODA20), January 5 - 8, 2020, Salt Lake City, Utah. Four parallel meetings: SIAM Symposium on Algorithm Engineering and Experiments (ALENEX20), SIAM Symposium on Simplicity in Algorithms (SOSA20), SIAM Symposium on Algorithmic Principles of Computer Systems (APOCS20), and the Theory Underlying Algorithms Workshop (TUNGA) took place at the same location.*
- *ACM-SIAM Symposium on Discrete Algorithms (SODA21), January 10-13, 2021.*
- *SIAM DM 2020, previously planned for June 2020 in Portland, OR, has been rescheduled due to Covid-19 outbreak. The current plan is to schedule the conference during the next SIAM Annual Meeting in July 2021.*

4.   Please indicate the number of minisymposia directly organized by the activity group at the last two SIAM Annual Meetings. When did the SIAG last organize a track of minisymposia at an annual meeting?

SIAG/DM had a Track with 12 minisymposia at SIAM/AN17 in Pittsburgh. The track was organized by our past vice-chair Lenore Cowen.

5.   Please indicate other activities sponsored by the activity group, to include newsletters, prizes and web sites. Have each of these been active and successful?

SIAG/DM awards the Denes Konig Prize biannually at the SIAM DM meetings.

SIAG/DM keeps an active mailing list informing its members about relevant activities. There is a web page under SIAM, which has been recently upgraded. The members remain informed about activities distributed through our mailing list.

6.   What activities are planned and proposed for the next period of the charter? Please describe scheduled and suggested future activities in detail.

In the next charter period, SIAG/DM plans to continue organizing the biennial SIAM Conference on Discrete Mathematics, co-organizing the annual ACM/SIAM Symposium on Discrete Algorithms (SODA) meeting and the related meetings organized in parallel to SODA (ANALEX, SOSA, APOCS). SIAG/DM will also support publication of high-quality discrete mathematics research through the SIAM Journal in Discrete Mathematics (SIDMA).

The SIAG is committed to supporting a continuing home for discrete mathematics via well-regarded established activities/venues and partnering as appropriate to strengthen the infrastructure for broader applied discrete mathematics/combinatorial algorithms community within SIAM.

In appointing co-chairs and selecting plenaries and minisymposia for the next DM meeting, SIAG/DM will strive to ensure representation from affiliated communities. Prior SIAM DM meetings show prior success with this strategy, with strong representation from theoretical computer science, discrete computational biology, bioinformatics, data science, etc.

SIAG/DM is willing to help in attracting additional SIAM membership from the applied discrete mathematics and discrete algorithms communities. We specifically plan to encourage utilizing the SIAM/SIAG member discounts at SODA, as well as ALENEX, APOCS and ANALCO, three conferences co-located with SODA that target experimental algorithm design and analytic combinatorics and naturally attract many applied discrete mathematicians.

We hope to increase membership by attracting discrete mathematicians within Europe and Asia. There is an ongoing discussion to extend our conferences to East Asia within the framework of SIAM.

7.   How can SIAM help the activity group achieve its goals?

The SIAM Konig Prize had past support from a one-time donation by Google. The amount given by Google was symbolic and will run out in 2022. We hope that SIAM will help us establish a larger fund by obtaining new support from IT industry sponsorship that would give us long-term security for the Prize.

Several participants have expressed their hope that SIAM could offer an option to pay for SIAM membership through (slightly increased) conference fee since many academic institutions do not offer support for society memberships.

There was a recent interest of discrete mathematics community in China to become involved in SIAM activities. In order to tighten the contacts and make them more formal, SIAM engagement would be needed.

8. How can the activity group help SIAM in its general role of promoting applied mathematics and computational science?

The main activity of the SIAG/DM is organizing of the bi-annual SIAM DM conferences and annual conference series of SODA. Both events are our flagship events. Many people think that SIAM DM is the highest quality conference series for graph theory and combinatorics in North America. We believe that this by itself is our great accomplishment and mission that promotes our activity. Our recent SIAM DM conferences had the organizing committee with two co-chairs, one from academia and one from industry. We plan to keep this model also in the future.

This activity group focuses on combinatorics, graph theory, cryptography, discrete optimization, mathematical programming, coding theory, information theory, game theory, and theoretical computer science, including algorithms, complexity, circuit design, robotics, and parallel processing. We provide an opportunity to unify pure discrete mathematics and areas of applied research such as computer science, operations research, combinatorics, and the social sciences.

SIAM is our unique opportunity to foster two-way communication: researchers from academia become familiar with current need for theoretical developments within industrial labs, and vice versa, the researchers in labs learn about important new theoretical developments in discrete mathematics.

9. How can the activity group help SIAM in its general role of promoting discrete mathematics?

The DM SIAG is crucial for providing a bridge to Theoretical computer science and algorithms communities. By promoting new achievements within discrete mathematics, we provide means of staying in contact with recent, inspiring developments in graph theory and combinatorics and crucial for work in applied combinatorics, theoretical computer science and discrete branches of industrial mathematics.

Signed by:

Bojan Mohar
SIAG/DM Chair

Date: July 1, 2020