

CHARTER RENEWAL SIAG/SDM (Data Mining & Analytics)

This CHARTER RENEWAL applies to the SIAM Activity Group on Data Mining & Analytics. The SIAG/SDM was originally formed under the aegis of SIAM on July 17, 2011 by the SIAM Council and by the SIAM Board of Trustees. This is the second charter renewal to be renewed by the council and board thereafter. The SIAG had 458 members as of December 31, 2014; of these, 247 were students.

The aim of the SIAM Activity Group on Data Mining is to advance the mathematics of data mining, to highlight the importance and benefits of the application of data mining, and to identify and explore the connections between data mining and other applied sciences. Within the framework of SIAM, the SIAG will conduct activities that implement its purposes.

The SIAG on Data Mining and Analytics organizes activities in Data Mining. The SIAG is expected to:

1. Organize minisymposia at the SIAM Annual Meeting.
2. At least once every five years, either organize a track of at least six minisymposia at the SIAM Annual Meeting or have an activity group meeting held jointly with the annual meeting. The VP for Programs and the VP at Large will coordinate the scheduling with the SIAG chair.
3. Organize a yearly SIAM International Conference on Data Mining (SDM). The program director and chairperson of the SIAG are responsible for ensuring the continuity of SDM, including either serving as co-chairs of the meeting or naming appropriate designees. The organizing committee must be approved by the VP for programs at least 16 months before the conference.

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.

I. 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 past [two/three] years?

Data mining and analytics is a rapidly growing field with burgeoning participation and collaboration between academia, industry, and government. The number of participants at established data mining conferences has kept on increasing as has the number of journal and conference submissions. The focus on big data analytics is quite strong and is being complemented by work on analysis and modeling of social and information networks. In recent years big data applications related to health informatics are increasingly common. Likewise SIAM DMA is now also a focal point for mathematically oriented work in the rapidly growing field of Machine Learning.

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?

In the last two years the SIAG membership increased from 458 to 936 as shown at Figure 1. In addition to the absolute growth shown Figure 1, Figure 2 shows that SIAM DMA is now the fourth largest SIAG. Figure 3 shows that the attendance at the SIAM Data Mining conference remains consistent. The SIAG is keeping up with changes in the field by maintaining the stature of the SIAM Data Mining (SDM) conference as one of the premier conferences in the field. Activities include rigorous review process for submitted manuscripts, organizing exciting plenary lectures, interesting panels and workshop and tutorials on current topics.

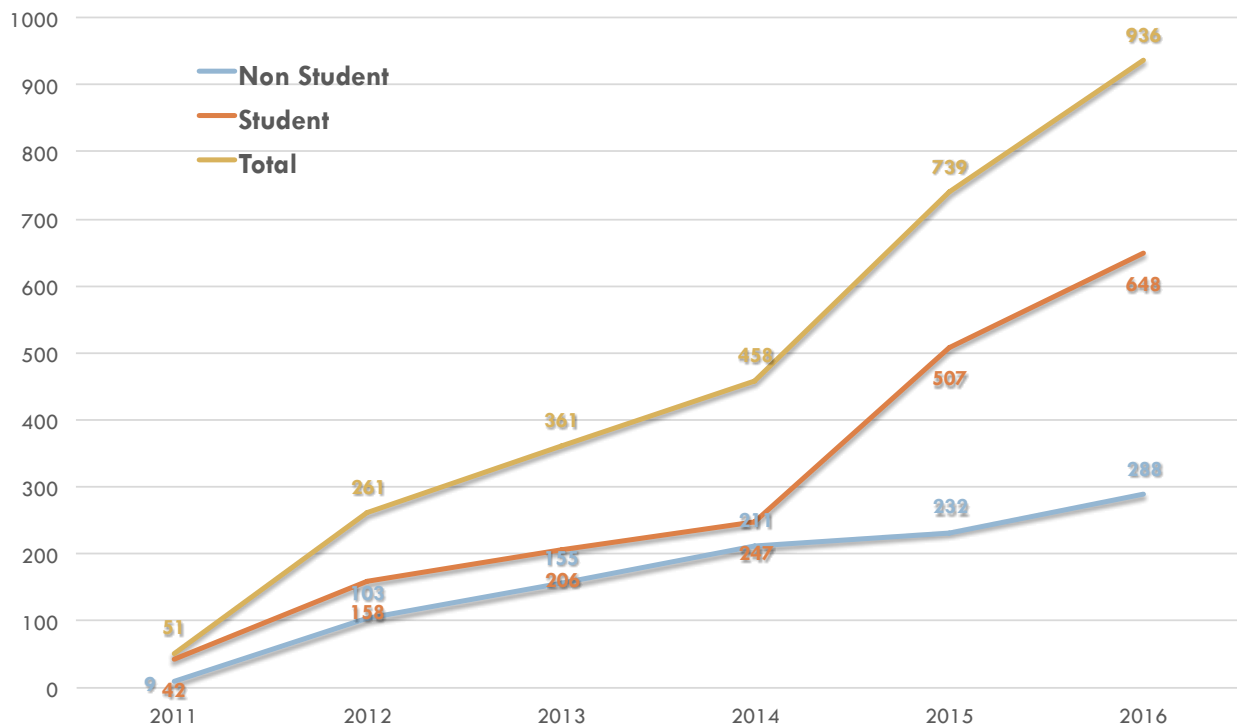


Figure 1: The total number of SIAG members (green), the number of student members (red) and non-student members (blue) from year 2011 to 2016

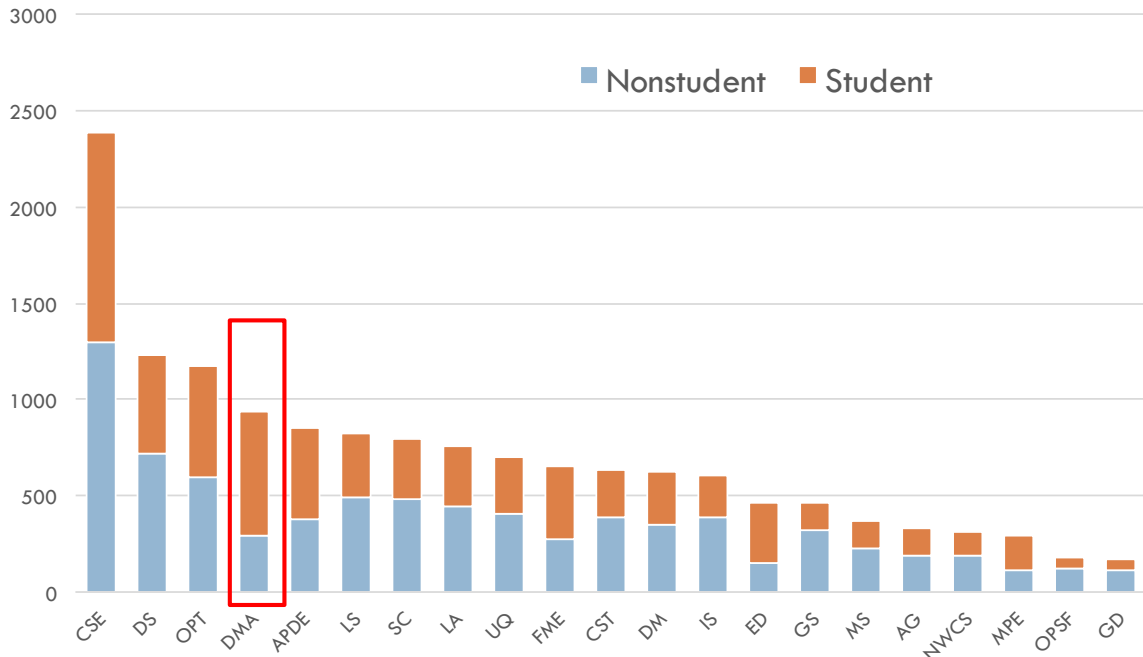


Figure 2: Relative sizes of SIAM SIAGs (2016). SIAM DMA is now the 4th largest SIAG.

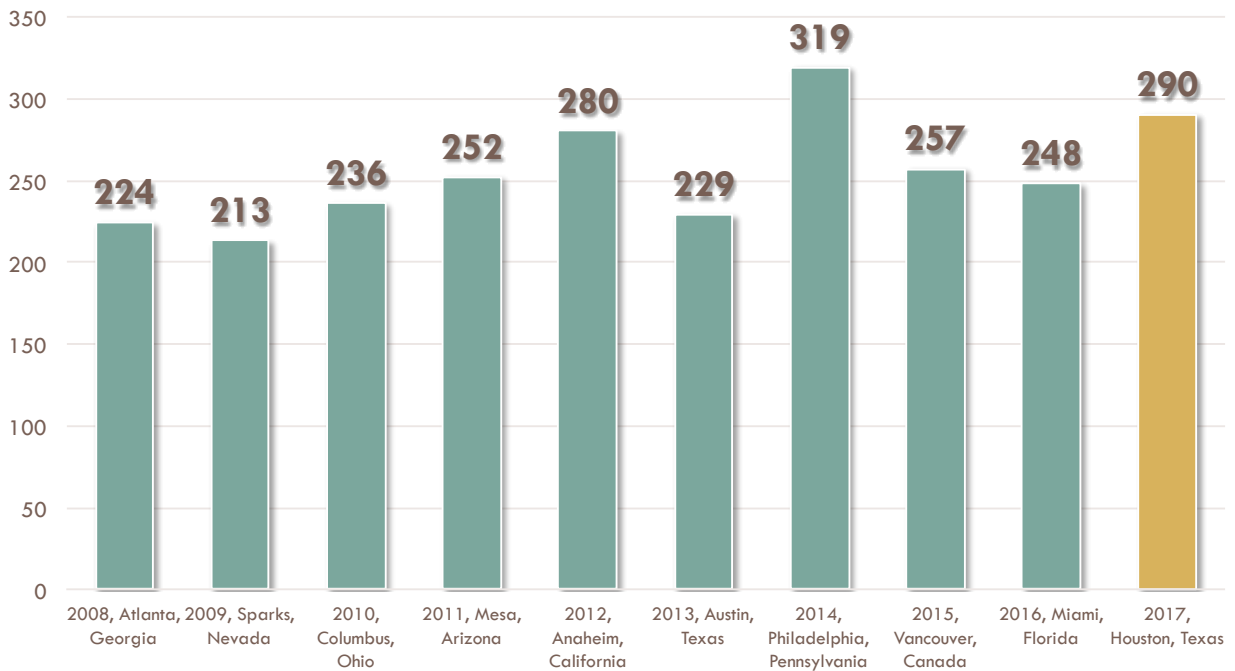


Figure 3: Attendance at SIAM Data Mining conferences.

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 2016 SIAM International Conference on Data Mining was held in Miami, Florida on May 5-7. The attendance was 248.

The 2017 SIAM International Conference on Data Mining was held in Houston, Texas on April 27-29. The attendance was >290.

In order to expand its scope, the SIAM International Conference on Data Mining has also started inviting mini-symposia and workshops. In 2017 there were six workshops on

- *Machine Learning Methods for Recommender Systems*
- *Data Mining for Medicine and Healthcare*
- *Workshop on Data Mining for Oil & Gas*
- *Inferring Networks From Non-Network Data*
- *Mining Big Data in Climate and Environment*
- *Women in Data Science*

SDM has established itself as a premier meeting for the mathematical aspects of data mining. This is reflected in its ranking among the conferences in the "data mining" category on MSR academic search summarized at Figure 4. (As of 2015, as MSR academic no longer produces these metrics).

| | KDD | SDM | ICDM | ECML/PKD D | CIKM | ICDE |
|------------------------|------------------|-----------------|------------------|----------------|------------------|-------------------|
| #papers (10yr) | 1212 | 611 | 2241 | 634 | 1840 | 2370 |
| #cites/paper (10yr) | 18.8 | 11.1 | 5.1 | 5.9 | 6.3 | 9.8 |
| Reg (regular) | \$750- \$1150 | \$525- \$755 | \$675 - \$969 | \$546 -- \$660 | \$740 - \$990 | \$760 - \$1165 |
| Reg (student) | \$400- \$600 | \$200- \$225 | \$400 - \$581 | \$400- \$600 | \$520 - \$700 | \$420 - \$620 |

Figure 4: Ranking of SDM among the top data mining conferences

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?

SIAM DMA organized 6 minisymposia at the 2016 annual meeting. These sessions included 48 talks organized by 11 SIAM members on the following topics:

- *GraphBLAS (Aydm Buluç)*

- *Algorithms and Statistical Methods for Noisy Network Analysis (Sanjukta Bhowmick & Ben Miller)*
- *Inferring Networks from Non-network Data (Rajmonda Caceres, Ivan Brugere, and Tanya Y. Berger-Wolf)*
- *Visual Analytics (Jordan Crouser)*
- *Mining in Graph Data (Jennifer Webster, Mahantesh Halappanavar, and Emilie Hogan)*
- *Scientific Computing and Big Data (Vijay Gadepally)*

The minisymposia were well received by the broader SIAM community; and were summarized by the organizers in SIAM News (<https://sinews.siam.org/Details-Page/data-mining-brings-it-to-siam-annual-meeting>).

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?

The best papers among those published at the SDM conference proceedings are invited for extension and consideration at a special issue of the Statistical Analysis and Data Mining Journal that is the official journal of American Statistical Society.

In 2017, the SIAM Data Mining conference gave out paper awards in the areas of Best Research Paper, Best Application Paper, Doctoral Forum Best Paper, and Doctoral Forum Best Poster Runner-Up. In addition, a new prized sponsored by IBM was awarded.

SIAM DMA was also pleased to have two of its members named SIAM Fellows over the period 2016-2017.

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

SIAG DMA has experienced fantastic growth in the past four years. Much of this growth has been in student memberships. Many of these students will take jobs in industry and this represents a great opportunity for SIAM to increase its industrial membership.

Another objective is to increase the number of non-domestic members of SIAM Data Mining.

SIAM International Conference on Data Mining successfully launched its workshop initiative with 6 workshops in 2017. A future goal is to continue this efforts as it this will encourage broader participation.

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

SIAM currently provides excellent support in organizing the SDM conference and in its support of the SIAG leadership. In the future, we would like to explore better ways of reaching out to our student members after they graduate and become employed by industry.

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

SIAM SDM is one of the fastest growing SIAGs. SDM produces many students who take jobs in industry and is a great opportunity to promote the value of applied mathematics and computational science to industry.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2018 and ending December 31, 2019.

Jeremy Kepner, SIAG Chair
May 20, 2017