

SIAM SIAG SUPERCOMPUTING CHARTER RENEWAL

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity on Supercomputing. The SIAM Activity Group (or SIAG) to which this renewal applies was originally formed under the aegis of SIAM on July 16, 1984 by the SIAM Council and July 17, 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 ten times thereafter. This SIAG had 681 members as of December 31, 2014; of these, 202 were students.

According to its Rules of Procedure, the objectives of the SIAG are provide an environment for interaction between developers of large-scale applications programs, applied mathematicians, algorithm designers, and computer architects, to foster the development of analytic methods, efficient algorithms, and applications software in context with advances in computer architecture as applied to high performance computing.

Its proposed functions are to:

- 1) Organize minisymposium at the SIAM Annual meeting in years when there is no Parallel Processing Conference.
- 2) Organize a track of at least six minisymposia at the SIAM Annual Meeting at least once every five years.
- 3) Organize a biennial SIAM Conference on Parallel Processing.

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.

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/three] years?

The field of supercomputing is as vibrant as ever. Continuous evolution of algorithms and architectures, along with expansion of the application basis keeps bringing new challenges and exciting opportunities. Exascale computing is causing significant changes in how we think about workflows and parallelism. This change is not only affecting the new algorithms, but also the existing software frameworks. Higher expectations on computational science and engineering lead to new and more sophisticated algorithms. More importantly, compute intensive simulations are being used by a wider spectrum of applications such as social sciences, in addition to the traditional areas of computational science and engineering.

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?

This SIAG is very vibrant. Attendances in the recent conferences have been steadily increasing. The next conference being in Europe brings extra excitement to the activity group. We expect PP16 to be an excellent conference and increase our presence in Europe.

We are also proud that our members are well represented among the new SIAM fellows, with Omar Ghattas, Ridgway Scott, and Christine Shoemaker as part of the class of 2014 and Tammy Kolda, Petros Koumoutsakos, and Esmond Ng as part of the class of 2015.

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

SIAG/SC has hosted the SIAM Conference on Parallel Processing 2014 (SIAM PP14) in Portland, OR with a very healthy attendance and active conference participation. SIAM PP12 was in Savannah, GA and was also a very good meeting.

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

While members of our activity group have organized and participated in minisymposia at the 2014 Annual meeting and ICIAM 2015, we have not organized a minisymposium directly under the name of this activity group. We have had our biennial meeting in 2014, and SIAG/SC president promoted ICIAM via emails to the SIAG mailing list and encouraged submissions. The location of the ICIAM 2015 made participation at ICIAM a difficult task.

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?

We have two prizes: career and junior scientist, given at the PPXY conference series. We also have an active mail list that is used to announce positions and workshops that might be of interest to SIAG/SC members. SIAG/SC is also working on a proposal for a best paper award.

6. What activities are planned and proposed for the next period of the charter? Please describe scheduled and suggested future activities in detail.
 - SIAM PP16: Apr 12-15, Paris, France
 - SIAM PP18: Date/Location TBD.

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

The most important activity of this group is the SIAM Conference on Parallel Processing for Scientific Computing. SIAM's support has played a crucial part in the success of this conference, and the continued support will be essential for this conference.

In the past, SIAG/SC community had complaints about lack of a natural journal for publication of related research. After the reorganization of SIAM-SC and inclusion of high performance computing as one of the 3 main sections, this problem has been addressed. We still have to make sure our community is better informed about this new opportunity.

Feedback from SIAM members in industry is that opportunities for continuing education would be helpful to them, especially in areas of rapid change, such as hardware technologies, programming paradigms, and software base. Tutorials offered at SIAM conferences or in regional meetings can be very helpful in this regard. Calling these events "training," as opposed to "tutorial" may make it easier to justify attendance by members in the industry. Our activity group can work with the SIAM leadership on how to provide continuing education on topics in applied mathematics and computational science engineering to the industry.

One area SIAM can help this activity group is broadening the use of applied mathematics and high performance computing in emerging fields like social sciences. Quantitative models are more commonly used in social sciences and sizes of the problems would naturally require supercomputing. While many members of our activity group are reaching out to these new research fields, promoting applied mathematics and high performance computing to these communities can certainly benefit from a bigger overall effort from SIAM.

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

SIAG/SC serves as a bridge between SIAM and the broader supercomputing communities. We believe this connection and the flow of information between two communities are critical for showcasing the impact of applied mathematics on the grand challenges of science and engineering.

SIAG/SC also has a relatively good representation by the industry. We can use this tie to strengthen SIAM's collaboration with the industry.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2016.

Ali Pinar,
SIAG/SC Chair

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