

## CHARTER RENEWAL APPLICATION

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group 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 with its initial operating period beginning January 1, 1985, and ending December 31, 1987. Its charter has been renewed by the Council and Board six (6) times thereafter.

According to its Rules of Procedure, the objective of the SIAG is to provide an environment for interaction between developers of large-scale applications programs, applied mathematicians, algorithms 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 function was to organize activities, including conferences and publications, to (1) promote the interaction of developers of applications programs, applied mathematicians, designers of algorithms, and computer architects and (2) keep SIAM membership up to date on trends in and use of new scientific computers. The focus will be on the interplay of analytic methods, numerical analysis, and efficient computation.

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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.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2006.

**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 three years?**

There is a rapid advance in the power and availability of supercomputing, with systems from IBM (BlueGene/L, 360 TeraFlops peak to be installed this fall at LLNL), SGI, NEC, and Cray providing great computational power with a variety of architectural approaches. These systems involve 10000 to more than 100000 separate processors. Developing algorithms that are suitable for this supercomputers at this scale is an important interest of SIAM members, as is the computational science that is only possible through use of machines at this scale.

**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?**

As of the end of 2004, we had 456 members.

A major application of supercomputing is in the simulation of complex phenomenon. These simulations combine work in mathematical modeling, numerical analysis, and the realization of algorithms as high-performance computer software. These are all areas of interest to SIAM. In addition, supercomputing systems may require special algorithms in order to make effective use of their large scale; these algorithms must reflect the best numerical and applied mathematics.

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

Co-Sponsored: The 16th International Conference on Domain Decomposition Methods, Courant Institute, New York City, January 12-15, 2005. This was a very successful meeting with 230 registrants.

Sponsored: SIAM Parallel Processing Meeting, San Francisco, 2004. A great success with a significant increase in attendance compared to the previous Parallel Processing Meeting.

**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?**

Five minisymposia were organized for the 2005 Annual Meeting:

MS16 Software Libraries for Large-scale Parallel Computing

MS35 BlueGene/L Applications - Part I of II

MS45 BlueGene/L Applications - Part II of II

MS59 Cray X1: Overview and Center Experiences - Part I of II

MS69 Cray X1: Application Experiences - Part II of II

**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?**

For the 2005 Annual Meeting, the activity group presented the following short course:

SC1 SIAM Short Course on Computer Architecture for Mathematicians and Numerical Analysts William Gropp, Argonne National Laboratory Thomas Sterling, NASA JPL and Caltech

The course had modest attendance and was well received by the students. The presenters plan to modify the course based on student feedback and offer it at subsequent meetings. One attendee has requested that we present the short course at his home institution.

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

SIAM Parallel Processing Meeting for February, 2006, in San Francisco.

A new web site and an electronic newsletter should be developed over the next year. One goal is to provide a convenient place to showcase recent results and discuss advances in supercomputing. This is a particularly good time to do this because of renewed vitality in the field of supercomputing, as evidenced by the number of new high-performance architectures and renewed interest in supporting high performance computing through such programs as DARPA's High Productivity Computing Systems project.

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

SIAM's expertise and experience with web sites for the activity groups will be a great help. The development of a clear calendar of responsibilities should also smooth the work of the AG officers.

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

Supercomputing makes some of the most difficult and interesting computational science possible. Results achieved on supercomputers are often widely publicized, both in the popular press and at scientific meetings. By showing the benefit of applied mathematics and computational science to a variety of

problems with clear benefit to society, through such means as the bi-annual parallel processing conference, the activity group promotes applied mathematics and computational science. To improve this mission, the activity group intends to develop a web site and mailing list that can showcase recent results and advances in the community.

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