

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 on 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 eight times thereafter. This SIAG has 710 members as of December 31, 2008.

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 purposed 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.

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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.

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 supercomputing and larger parallel computing fields, which SIAG/SC represents, are experiencing a kind of intense interest that is probably as great as ever in the history of this SIAG. The simultaneous emergence of multicore and manycore processor architectures, and the architecture and algorithms challenges at extreme scale present tremendous challenges and opportunity to the algorithms experts of SIAG/SC and put our work on the critical path to almost any technical computing advances where performance is an issue. Furthermore, as computational science & engineering software on supercomputers becomes more important, reliability issues come to the forefront, forcing us to seriously look at modern software engineering techniques and solution optimality and sensitivity.

Presently our community is very busy studying the impact of architecture changes on the computing landscape. In particular we are concerned about manycore algorithms and programming models since our standard algorithms and programming models will not be

adequate for future supercomputers. We also see an increased focus on mathematical optimization and uncertainty quantification, as users demand higher quality computational results and computing capability grows to support the kind of massive computation these approaches require. We also see resurgence in shared-memory parallel algorithms.

Other topics that are timely and related to SIAG/SC are so-called “green” computing, which is somewhat related to extreme-scale issues, but is also important for ubiquitous desktop and departmental computing. Power consumption may become such an important issue that algorithms choices will be influenced. Also, cloud computing and its implications for algorithms are becoming important, especially as a resource for application execution, and resulting demands on algorithms and software.

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?*

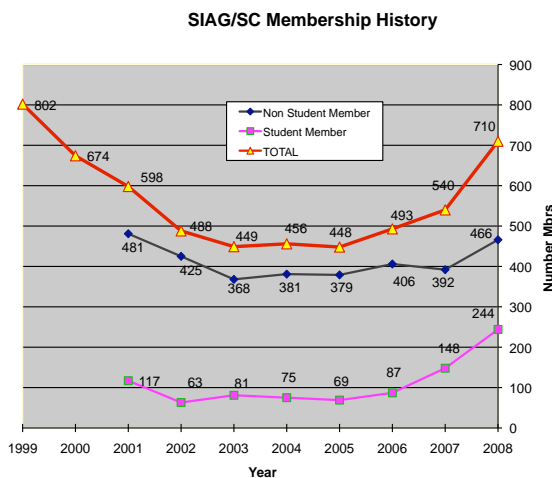


Figure 1: SIAM SIAG/SC Membership Statistics

SIAM SIAG/SC is very vibrant. In 2002 there was some concern that perhaps the SIAG and its related PPXY conference had reached a natural ending point. However, presently the SIAG is healthy (see membership statistics in Figure 1) and the last few conferences have been very well attended. Attendance was 393, 401 and 375 at the 2004, 2006 and 2008 conferences, respectively. Although there was a dip in attendance for 2008, the reduction came solely from non-member attendance, which was down from 123 in 2006 to 18 in 2008. Attendance by SIAG/SC members went from 187 to 227 from 2006 to 2008. Location (San Francisco in 2006 and Atlanta in 2008) was probably a factor. We expect PP10 to be an excellent conference and the location of Seattle to be advantageous.

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 2008 (SIAM PP08) in Atlanta, GA with a very healthy attendance and active conference participation. SIAM PP06 was in San Francisco and was also a very good meeting. We have also sponsored special supercomputing-related minisymposia at the SIAM Conference on Computational Science and Engineering 2009 (CSE09).

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?

We have sponsored five minisymposia (Mike Heroux (1), Esmond Ng (1), Padma Raghavan (3)) at the SIAM Annual Meeting 2009 in near-fulfillment of our once-every-five-years commitment. We also had one minisymposium at the 2008 annual meeting (Padma Raghavan and Lenore Mullin).

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/SC maintains a website and has just started a wiki. We have a mail list to which postings are made a few times a month announcing positions and workshops that might be of interest to SIAG/SC members. SIAG/SC has written a proposal for two prizes to be given at the PPXY conference series. We hope to have approval in time for the SIAM PP10 meeting.

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

- SIAM Annual Meeting: Minisymposium on Extreme-scale computing challenges.
- SIAM PP10: Feb 24-26, 2010, Seattle, WA USA.
- SIAM PP12: Date/Location TBD.

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

Perhaps the single largest missing element for SIAG/SC is a natural journal for publication of related research. Certainly SIAM-SISC is a related journal and SIAG/SC members publish in it, but SIAM-SISC has not traditionally published much of the SIAG/SC-related research content. Instead SIAG/SC-related content has been published in other venues such as the Supercomputing conference series proceeding and other high performance computing journals. We think this is a function of two things: SIAM-SISC has a tradition of publishing theoretical and small-scale computing results. Also, the time lag between submission and publication of papers in SIAM-SISC is very long (12-18 months) which is not ideal for SIAG/SC-related research since supercomputing is a fast-paced field.

We have discussed this issue with the SIAM-SISC editorial staff and there is interest on their part to accept more content from SIAG/SC-related work, but we need to find some way to inform SIAG/SC members about this possibility.

We do not have specific proposals for how to address this situation, nor is it clear that we need to change it. Rather than changing SIAM-SISC, perhaps another approach would be to consider a new SIAM journal for SIAG/SC-related content, one that focuses on rapid turn-around and

shorter papers. Or perhaps, we could use the “Timely Communications” mechanism of SIAM-SISC for SIAG/SC-related content. We are open to suggestions.

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

SIAG/SC represents the intersection of SIAM with the wider supercomputing and parallel computing communities. Therefore, we can help SIAM understand these communities and recognize opportunities for future interaction. Furthermore, our strong focus on algorithms and mathematical techniques, and matching of algorithm to high-performance/research architectures gives us a leading role in supporting SIAM's applied mathematics mission in this area.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2010.

Sincerely,

A handwritten signature in black ink, reading "Michael A. Heroux". The signature is written in a cursive style with a light blue background behind it.

Michael A. Heroux
Sandia National Laboratories
Chair, SIAM Activity Group on Supercomputing
June 18, 2009