

SIAM Activity Group Geosciences Charter Renewal

This CHARTER RENEWAL applies to the SIAM Activity Group on Geosciences (SIAG/GS). The SIAG/GS was originally formed under the aegis of SIAM in July 1991 by the SIAM Council and the SIAM Board of Trustees with its initial operating period beginning January 1, 1992 and ending December 31, 1994. Its charter has been renewed by the Council and Board eight (8) times thereafter.

This SIAG has 495 members, including 170 student members, as of December 31, 2015.

According to its Rules of Procedure, the objective of the SIAM Activity Group on Geosciences is to provide an established forum for interdisciplinary interactions among mathematicians, engineers, chemists, physicists, and other scientists having special interests in flow in porous media and geophysics.

Its purposed functions were:

1. The SIAG will organize activities, including conferences and publications, to promote the interaction of practitioners and researchers and to keep the SIAM membership up to date on trends in geosciences.
2. The SIAG shall not present awards or otherwise recognize scientific achievement, professional service, or the like without prior approval by both the SIAM Major Awards Committee and the SIAM Council of the award criteria, the method of selection of recipient(s), the nature of the award, and all other aspects, if any, of each such award must have the prior approval of the SIAM Board of Trustees.

Other activities may include:

3. Organize minisymposia at the SIAM Annual Meeting in years where there is no SIAG conferences.
4. 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.
5. Organize a biennial SIAM Conference on Geosciences. 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 16 months before the conference.

6. 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.
7. Award the biennial SIAG/GS Career Prize and the SIAG/GS Junior Scientist Prize.
8. Maintain a wiki site for the activity group
http://wiki.siam.org/siaggs/index.php/Main_Page

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. List all current officers of the activity group (including advisory board, if relevant).
 - Chair: Carol Woodward
 - Vice-Chair: Juan Restrepo
 - Program Director: Jorn Behrens
 - Secretary: Jodi Mead

These officers are serving a two-year term from Jan. 1, 2015 – Dec. 31, 2016.

2. 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 field of mathematical methods in the geosciences continues to flourish. Subsurface applications for petroleum include many of the same areas as have historically been in the field: enhanced recovery and seismic inversion, and have expanded to include carbon sequestration, fracking, fracture modeling, and large-scale uncertainty quantification. Water resources simulations include not only aquifer management and remediation, but have been evolving to include large-scale simulations and coupling with surface and atmospheric simulations for full water cycle understanding within large watershed and continental-scale models.

The field is actively growing and evolving beyond these areas which formed the core of the activity group for many years. In particular, the growing need to understand climate change and its effects have driven substantial advances and challenges in areas such as cloud physics, ocean-atmosphere coupling, sea ice and ice sheet modeling, and local effects modeling such as tsunami and hurricane modeling.

In many of the applications driving geosciences simulation, coupled multiphysics effects are being included in far greater amounts than ever before. Accurate simulation of these effects drives the need for methods able to accurately and stably handle multiple scales in space and

time while generating a solution with quantified error. New methods development focuses in this area along with analysis of the highly complex data resulting from these systems.

All these new developments are happening concurrently with a shift in computer architectures at the highest end. As a result, there is deep need and progress in research for how to conduct these simulations on state-of-the-art high speed computers making use of multi and many core accelerators.

During 2015, we conducted a survey of GS Activity Group members. When asked what the most important topics were for respondents, the ones garnering largest responses were in the areas of flow in porous media, data assimilation, uncertainty quantification, climate modeling, and methods for multiscale and multiphysics simulations.

3. 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 doing very well and the members are connected well to other SIAM groups (such as CSE). Membership in 2015 was the second highest in the history of the activity group at 495 (second to 2010 which was 501). Nonstudent membership has been increasing steadily since the start of the activity group, and that continues. Student membership, which saw a decline from 2011-2014, increased by about 50% in 2015, so we consider the group to be doing quite well.

This group has been increasing its participation from climate science and other “above ground” areas for many years and will continue to do so. As more and more simulations of subsurface effects take into consideration effects from the surface, and vice versa, these fields will continue to interact. In addition, we continue to see sharing of mathematical methods and experiences between scientists from differing domains, as often method advances in one area can impact those in other areas.

4. 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.

In 2015, the SIAG/GS sponsored the SIAM Conference on Mathematical and Computational Issues in the Geosciences at Stanford University. This conference included 425 attendees as compared to 444 from the previous conference in 2013 in Padua Italy. While this is a decrease, it is a small one, and we are not worried about future conference attendance. Based on attendee survey responses, over 87% of respondents thought the technical program was

excellent, and over 82% thought the plenary talks were interesting. Over 90% thought the minisymposia were interesting and well-focused.

The 2015 conference moved the minisymposia to a format of 6 talks, each of 15 minutes with 5 min. for questions. In addition, minisymposium organizers were asked to leave 1-2 slots free to add contributed presentations. In general, attendee survey responses were split on whether the shorter talks worked. However, there were only a few negative and many positive comments on moving contributed talks into minisymposia.

5. 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 at an annual meeting or meet jointly with the SIAM Annual Meeting?

Because of the number of Activity Groups, the current guidelines are that an Activity Group should organize a track about every seven (7) Annual Meetings or meet jointly with the Annual Meeting within a seven (7) meeting period.

2014 SIAM Annual meeting MS 4/17, MS 31/47/62, MS 76, MS 93, MS 109 (5 total in 8 sessions).

The SIAG has not met jointly with the SIAM Annual meeting.

The SIAG/GS organized a minisymposia at the SIAM Annual meeting for 2016.

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

There is a wiki site used as a repository of information, and Stefan Vater and Jodi Mead have updated the information on the site. We send a newsletter (approximately twice yearly) with information about upcoming conferences and other items of interest. In addition, timely messages are forwarded at once to members on our email list; these average a few a month.

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

The next SIAM Conference on Geosciences will be held in Sept. 2017 in Erlangen, Germany. An organizing committee has been set up and plenary speaker selection is underway.

The 2019 meeting will likely be held in the United States. It is too early to know if the dates will stay in the fall or move back to spring.

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

Continue to support our activities, including especially our conference, minisymposia at SIAM Annual meetings, prizes, and members, in particular students and those outside academia.

We are also considering developing reciprocal relationships with AGU and APS for meeting attendance. SIAM's help in consideration of what will make sense for this would be appreciated.

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

We reach out broadly beyond the applied mathematics communities into the geosciences, to researchers in industry and scientific disciplines that are not as well represented otherwise in SIAM.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two year operating period beginning January 1, 2017. Signed,

 5/31/16

Signed and dated by SIAG Chair