

CHARTER RENEWAL APPLICATION

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on Nonlinear Waves and Coherent Structures (SIAG/NWCS). The SIAG/NWCS was originally formed under the aegis of SIAM on December 7, 2002 by the SIAM Board of Trustees and on March 26, 2003 by the SIAM Council with its initial operating period beginning January 1, 2003 and ending December 31, 2005. Its charter has been renewed by the council and board two times thereafter. This SIAG has 283 members as of December 31, 2009.

According to its Rules of Procedure, the objective(s) of the SIAG/NWCS are:

- to foster activity in the area of nonlinear waves and coherent structures.
- to foster collaborations among applied mathematicians, physicists, fluid dynamicists, engineers, biologists, and economists in those areas of research related to the theory, development, and use of nonlinear waves and coherent structures.
- to promote and facilitate nonlinear waves and coherent structures as an academic discipline.

Within the framework of SIAM, the SIAG/NWCS will conduct activities that implement its purposes.

Its proposed functions are:

- 1) Organize a biennial SIAM Conference on Nonlinear Waves and Coherent Structures.
- 2) Consider dovetailing specialized workshops and conferences with the SIAM Annual meeting. In particular, it is planned to have the biennial meeting alternate loosely between university-style meetings, ones dovetailed with SIAM Annual Meetings, and joint meetings with other SIAGs.
- 3) Broker partnerships between academia, industry, and government laboratories. The SIAG will seek to facilitate the establishment of academic programs in nonlinear waves and coherent structures to foster its development as an academic discipline. The SIAG also will facilitate the placement of undergraduate and graduate students in internships in industry and government laboratories.
- 4) Work with other professional societies to promote nonlinear waves and coherent structures. For example, SIAM and another society might organize a workshop on a topic of mutual interest. The SIAG also would attempt to increase government support for nonlinear waves and coherent structures through various outreach activities.

The SIAG/NWCS 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 three years?

The field of nonlinear waves and coherent structures continues to be an active one spanning many academic disciplines. The upcoming SIAM NW10 conference reflects significant continued interest in a wide variety of application areas: general relativity and cosmology, reactive flow and combustion, biology, optics and photonics, water waves (plus tsunamis and rogue waves). On the more mathematical side, themes will include solitons and integrable systems, and the dynamics and stability of waves, and interest in such mathematical topics has not decreased. The direction in some applied fields, such as optics applied to telecommunications, has been

affected by economic situations and it is not at all clear what particular commercial directions will be a main focus in the coming years, but basic research in these areas is continuing at only slightly reduced levels. Interest in research related to tsunamis and rogue waves has appeared to increase over the past few years due to events that have been reported in the news.

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?

Membership of the SIAG continues to grow, from 259 in 2008 to 283 in 2009. The number of non-student members has remained relatively constant (140-145), but the number of student members has increased steadily. Currently, the membership stands at about 50% student members and 50% non-student members. Participation at the upcoming SIAM NWCS conference (August 2010) is expected to be strong, with 7 plenary talks and over 300 talks in minisymposia or contributed sessions. The program committee of the conference worked hard to ensure that new and exciting topics would be represented at the conference.

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.

The activity group organizes a major conference along the themes of nonlinear waves and coherent structures every two years. The last conference was held in Rome in 2008, and was of a similar size to what is expected at the upcoming meeting in Philadelphia. The main issue/complaint about the Rome meeting was the cost of attending; as a result, efforts were made to control costs as much as possible for the upcoming meeting. A key decision was the selection of the site with reasonable hotel/travel costs.

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?

The activity group helped organize sessions at the 2009, "Dynamics, Stability, and Rare Events for Mode-locked Lasers" (3 parts) and "Stability of Solitary Waves in Lattice and Fluid Dynamics". No such minisymposia are planned at the 2010 annual meeting due to the closeness to the activity group's meeting in August.

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

The main activity in addition to the biennial conferences has the training workshops that the activity group organized at the University of Washington (2006) and Rome (2008) meetings. For the Rome workshop the activity group secured \$20k in funding from the NSF to support students and postdocs from US institutions. These workshops have been very successful. The activity group recently started an email list; it is not getting much traffic yet, but it will be promoted at the August meeting. In addition, an activity group website is being planned.

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

The activity group will continue to hold the biennial conference, as this continues to be a very popular event. Note that over the last few years there have been two other biennial nonlinear waves meetings, the "IMACS International conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory" which has been held for the past 14 years the University of Georgia, and more recently the "International Conference on Nonlinear waves --- Theory and Applications" being held for the second time this coming summer in Beijing. It is noteworthy that attendance at the SIAM Activity Group's meeting has been strong despite these other meetings. It would be interesting to explore better coordination with the Beijing group (e.g.,

a joint meeting), as recent SIAM activities have suggested that the organization as a whole would like to strengthen ties with researchers in China.

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

The activity group unfortunately did not organize a student workshop this year. The SIAM staff made it clear that this was not something that they could assist with, and the constraints of the site selected for the meeting, as well as the lateness of the site selection, made the possibility of organizing such a workshop difficult. Any help that SIAM could give in organizing a student workshop co-located with the activity group's biennial meeting would be extremely helpful.

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

Because of the wide-ranging connection between nonlinear waves/coherent structures and a number of application areas, the activity group has the opportunity to make significant ties between applied mathematicians in academia, industry and government labs. This is also something that strongly distinguishes the activity group's biennial meeting from the other meetings mentioned about: the SIAM meeting has much greater application content, and a much greater potential for significant connections with industry. In the area of nonlinear optics, for example, ties could also be made with the Optical Society of America (OSA) and the Institute of Electrical and Electronics Engineers (IEEE).

The SIAG/NWCS requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2011.

Signed

William L. Kath
SIAG/NWCS Chair

15 June 2010