

Nonlinear Waves and Coherent Structures

Charter Renewal

This CHARTER RENEWAL applies to the SIAM Activity Group on Nonlinear Waves and Coherent Structures. The SIAM Activity Group (or SIAG) to which this renewal applies was originally formed under the aegis of SIAM on March 26, 2003 by the SIAM Council and December 7, 2002 by the SIAM Board of Trustees with its initial operating period beginning January 1, 2003 and ending December 31, 2005. Its charter has been renewed by the Council and Board four (4) times thereafter. This SIAG has 247 members, including 105 student members, as of December 31, 2013.

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

- 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.
- Its purposed functions were:

The SIAG on NWCS will organize activities in Nonlinear Waves and Coherent Structures. The SIAG is expected to:

- The SIAG on Nonlinear Waves and Coherent Structures (NWCS) will promote and facilitate research in the area through a variety of activities, including:
 - Organize a biennial SIAM Conference on NWCS. The SIAG also will 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.
 - Broker partnerships between academia, industry, and government laboratories. The SIAG will seek to facilitate the establishment of academic programs in NWCS 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.
 - The SIAG will work with other professional societies to promote NWCS. 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 NWCS through various outreach activities.

Other activities may include:

- Organize minisymposia at the SIAM Annual Meeting in years where there is no SIAG conference.
- 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.

- 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.
- Award of the biennial Martin Kruskal Lecture Prize, established in 2012.

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.

- List all current officers of the activity group (including advisory board, if relevant).

Edgar Knobloch (Berkeley) – Chair

Margaret Beck (Boston) – Vice-Chair

Paul Milewski (Bath) – Program Director

Richard Moore (NJIT) – Secretary

- 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?

While much of the strengths of the SIAG NWCS group lies in its traditional core areas (fluid dynamics, nonlinear optics) the fields covered by the group continue to evolve, with increased interest in the 2014 NW Conference from geoscientists and material scientists. This is a welcome direction that we hope will turn into a permanent trend. Relatively new areas for the group involve applications of nonlinear waves in biology, including neuroscience and ecology. Climate research, particularly dynamics, also finds a ready home within the group. While these disparate areas appear to lack coherence they are connected via the important role played by nonlinear waves and coherent structures in all of them. As a result mathematical and numerical developments in one area quickly find their way to others, a process fostered and encouraged via the conferences and workshops organized by the group.

- 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 membership of the SIAG NWCS by established scientists is holding constant but the number of student members has fallen for a second charter period in a row. As a result the overall membership of the group has fallen. We are unsure as to the reason for the decrease in student numbers, but it may be linked to falling support for basic research. On the other hand the conferences and workshops organized by the group remain as popular as ever, and the number of topics covered by the NWCS conference continues to grow. As a result the conference attracts participation from beyond the activity group. Overall the group appears to have matured and found its niche within the SIAM family.

- 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.

The SIAG NWCS organizes the biennial conference on Nonlinear Waves and Coherent Structures. The list of conferences may be found at:

<http://www.siam.org/meetings/archives.php#nonlinearwaves>. The 2012 SIAM Conference on Nonlinear Waves and Coherent Structures was held in Seattle, Washington and had 297 attendees. The 2014 SIAM Conference on Nonlinear Waves and Coherent Structures will be held in Cambridge, UK. There will be 94 Minisymposia and 13 Contributed Sessions, with well over 400 participants expected, making this conference substantially larger than all preceding ones. The conference will be preceded by a three-day summer school on the Theory of Water Waves to be held in Cambridge on 6-8 August, organized by Tom Bridges and intended for PhD students and early career researchers. In the past these summer schools have been a great success. Both events are held in conjunction with the 2014 Isaac Newton Institute Programme on the Theory of Water Waves.

- 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?

The SIAG NWCS organized a track at the 2013 SIAM Annual General Meeting in San Diego, including an invited lecture by M Haragus and a Minisymposium on “Recent advances in spatio-temporal pattern formation and nonlinear waves I,II”.

The SIAG NWCS is not organizing a track at the 2014 SIAM Annual General Meeting owing to its proximity to our conference, but we do plan to propose a track at the ICIAM 2015 in Beijing (which replaces the 2015 Annual General Meeting).

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

The SIAG will award the second Martin Kruskal Lecture Prize at the 2014 NWCS Conference to Mark Ablowitz (U Colorado).

The SIAG NWCS uses the blog forum provided by SIAM to publicise the variety of research areas involving our members and to convey the importance and excitement of these areas.

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

The SIAG NWCS will organize a track at the ICIAM 2015 in Beijing in connection with the “International Year of Light” that will take place in 2015. In addition there will be an NWCS Conference in 2016 (at a venue to be determined) coupled if at all possible with a summer school on some aspect of nonlinear waves, as has been the practice in the past.

- How can SIAM help the activity group achieve its goals?

The vibrancy of SIAM is of paramount importance to the success of all the activity groups. SIAM attracts both senior and junior members and these find more often than not a home in one or more of the activity groups. Travel grants for PhD students and recent PhD recipients will be of key importance in enabling young scientists to attend ICIAM 2015 and the 2016 SIAG NWCS Conference. These conferences raise interest in the research activities of the group, both basic and applied, and travel support, particularly in times of diminishing support for basic research, is of critical importance.

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

The activity group promotes, through its membership and conferences and workshops, one of the traditional areas of applied mathematics. While the subject of nonlinear waves has developed greatly over the last century, it remains vibrant and attractive to both applied mathematicians and students since its study requires a combination of deep analytical insight together with expertise in a variety of numerical techniques that find applications in all the areas represented by SIAM.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two year operating period beginning January 1, 2015.

Signed

Edgar Knobloch, NWCS/SIAG Chair
[29 May 2014]