SIAG Dynamical Systems (DS)
Charter Renewal

The SIAG/DS was formed under the aegis of SIAM by the SIAM Council on December 2, 1988, and by the SIAM Board of Trustees on December 3, 1988. Its initial operating period began January 1, 1989, and ended December 31, 1991. Its charter has been renewed by the Council and Board every two years thereafter.

In accordance with the Rules of Procedure, the SIAG/DS aims to bring together researchers interested in the theory and applications of dynamical systems. Interests can range from fundamental mathematics of dynamical systems to the development of software for use in the study of dynamics, to applications in disciplines such as physics, chemistry, engineering, and the life sciences. The activities of the SIAG are designed to foster interactions between the academic community and researchers in industry and government laboratories, and to stimulate cross-disciplinary activities among people with similar interests but often different backgrounds. The SIAG had 1227 members as of 12/31/16 and of those 536 were students.

The SIAG/DS is currently responsible for the following activities:

- Organize a biennial Activity Group meeting (SIAM Conference on Applications of Dynamical Systems);
- Sponsor the Jürgen Moser Lecture at the biennial Activity Group meeting by an individual who has made distinguished contributions to nonlinear science;
- Award the J.D. Crawford Prize at the biennial Activity Group meeting to an individual for a recent outstanding publication on a topic in dynamical systems and nonlinear science;
- Award the "Red Sock" Prize at the biennial Activity Group meeting for up to four poster presentations in dynamical systems by students or postdocs at the meeting;
- Organize minisymposia at the SIAM Annual Meeting in years when there is no Activity Group meeting;
- 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; and
- Maintain and enhance the Dynamical Systems Web portal DSWeb (https://dsweb.siam.org) for members of the Activity Group and the public at large. Maintain social-media presence, such as the Activity Group's Twitter account (https://twitter.com/DynamicsSIAM) and associated Facebook page

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The SIAG complements SIAM's activities and supports its functions. The answers to the questions below indicate how this was accomplished and what the officers propose as the future directions for the SIAG.

- 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?

SIAG/DS continues to thrive as a highly interdisciplinary activity group, with large representation of people from scientific and engineering fields participating in its biennial meeting. Applications related to social sciences, public health and medicine are also represented. Traditional mathematical areas of focus include multi-scale modeling, network science, delay differential equations, stochastic processes, pattern formation, dynamical systems methods for PDEs, and numerical continuation methods. Emerging areas of growth include those with a strong interface to data, including data assimilation and data-driven modeling.

- 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?

SIAG/DS is the second largest of the SIAM activity groups, and it forms a strong and vibrant community that is fostered by the SIAM infrastructure for meetings and publications and communication. Its membership is stable with ~700 non-student members and more than 500 student members.

The SIAG/DS has especially strong ties with the following activity groups: Life Sciences, Nonlinear Waves and Coherent Structures, and the new Mathematics of Planet Earth. It has traditionally represented key components of applied mathematics that are tied to mathematical modeling in scientific domains. It will contribute to emerging applied mathematical challenges related to uncertainty quantification, and the integration of data and modeling.

- 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 SIAG/DS was formed in 1988, and has sponsored the SIAM Conference on Dynamical Systems in odd-numbered years since 1995, convening in Snowbird, UT; two earlier meetings took place prior to 1995: in 1990 (Orlando FL) and 1992 (Snowbird).

The 2017 Snowbird meeting (DS17) had over 900 registered participants, which was the largest conference to date. This SIAM conference is now arguably the most important international conference in applied dynamical systems.

The location of the conference in Snowbird presents perennial challenges, but has also become an integral part of the conference identity – it is often referred to as "the Snowbird meeting". Problems include high elevation (for people prone to altitude sickness), limited dining options, and insufficient break-out rooms for the parallel sessions. We now exceed capacity – the most recent work-around was to move contributed talks by students to posters (which worked ok since poster sessions are highly successful). A suggested compromise solution - to alternate meetings between Snowbird and another site - should be pursued as it might broaden participation, e.g. by bringing back in those who don't like the venue or can't tolerate the

altitude. (Tackling this topic at the onsite business meeting doesn't give fair representation to those who cannot attend.)

- Please indicate the number of mini symposia 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 activity group last organized a track (of 7 mini symposia) at AN14; details were reported in the last charter renewal. The activity group will next organize a track at AN18; Chad Topaz is on the organizing committee for that meeting, representing SIAG/DS.

Details of mini symposia organized by the activity group have not been routinely compiled. As co-organizer of AN16 I can attest to there being only modest participation from activity group members in the annual meeting. Many in the activity group are highly involved with SIAM only through SIAG/DS, and this serves a strong purpose for advancing dynamical systems in applied directions and raising awareness about SIAM as a professional society. A possible explanation for this limited engagement with SIAM is that many in SIAG/DS are scientists and engineers who do not identify themselves foremost as applied mathematicians. This should not be perceived as a problem, although it could be perceived as a lost opportunity.

- 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 DSWeb portal, which includes the periodical Dynamical Systems Magazine, has been highly successful as a promoter of dynamical systems, and as a site to advertise open positions and upcoming workshops, as well as report on research groups and important conferences and provide tutorials. Book reviews and editorial opinion are also featured on the site, which has recently been re-vamped with the help of SIAM. There is now an active @DynamicsSIAM twitter account, with more than 700 followers as of May 2017.

The SIAG/DS has been a contributor of material in SIAM News; Hans Kaper is its editor-in-chief and is a long-standing active member of the activity group.

The SIAG/DS gives out three awards at its biennial meeting:

The Jürgen Moser Lecture, established in 2000, is awarded to a person who has made distinguished contributions to dynamical systems or nonlinear science. The prize consists of a special lecture along with a cash prize. The 2017 Moser Lecture was given by Ed Ott of the University of Maryland.

The J.D. Crawford Prize, also established in 2000, is awarded to a person for a recent outstanding publication on a topic in dynamical systems and nonlinear science, as evidenced by a publication (in English) in a peer-reviewed journal within the last four years. The 2017 J.D. Crawford Prize was awarded to Martin Wechselberger of the University of Sydney.

The Red Sock Award, elevated to the status of a recognized SIAM prize in 2012, is awarded for the best poster presentations in dynamical systems by a student or postdoc. Five winning posters were selected at DS17. This award contributes to the success of the poster sessions at the conference, which are

engaging, very well attended, and a positive experience for students.

The most recent conference DS17 added two new activities – a well-attended student ice-breaker event at the start of the conference, and a mentoring event for women, each of these contribute to professional development of SIAG/DS junior researchers. There were also two mini-tutorials offered at DS17: one on Rigorous Numerics in Dynamics and the other on Data Assimilation.

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

One of the important activities will be planning for DS19, the biennial Conference on Dynamical Systems. During 2018, committees will be organized for selection of the 2019 Moser and Crawford prizes, as mentioned above. Continuation of the high quality reputation of DSWeb will be an important priority.

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

The financial support for the monetary portions of the Moser and Crawford Prizes and the Red Sock Awards is very helpful.

The SIAG/DS relies on continuing technical support from SIAM for the DSWeb portal.

The assistance of SIAM will be appreciated in evaluating possible future alternatives to the Snowbird venue for the Conference on Dynamical Systems.

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

The SIAG/DS is one of the more interdisciplinary within SIAM, and supports exposure to outside disciplines through the choice of plenary speakers and minisymposium speakers at the Snowbird conference.

The DSWeb portal is a very successful ambassador of dynamical systems, and mathematics in general.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two year operating period beginning January 1, 2018 and ending December 31, 2019.

Signed,

Mary Silber, Chair of the SIAG on Dynamical Systems

June 2, 2017