

Pro Forma CHARTER RENEWAL APPLICATION

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on Life Sciences. The SIAM Activity Group (or SIAG) to which this renewal applies was originally formed under the aegis of SIAM by the SIAM Council and the SIAM Board of Trustees by electronic mail in Fall 1999, with its initial operating period beginning January 1, 2000, and ending December 31, 2002. Its charter has been renewed by the Council and Board one time thereafter. This SIAG has 505 members as of May 1, 2005.

According to its Rules of Procedure, the objective of the SIAG is to foster application of mathematics to the life sciences and research in mathematics that leads to new methods and techniques useful in the life sciences. The life sciences have become quantitative as new technologies facilitate collection and analysis of vast amounts of data ranging from complete genomic sequences of organisms to satellite imagery of forest landscapes on continental scales. Computers enable the study of complex models of biological processes. The SIAG will bring together researchers who seek to develop and apply mathematical and computational methods in all areas of the life sciences. It will provide a forum that cuts across disciplines to catalyze mathematical research relevant to the life sciences and rapid diffusion of advances in mathematical and computational methods.

Its proposed function was to organize activities, including conferences at various times and locations, sessions and minisymposia at SIAM meetings, workshops and educational forums to promote interaction among mathematicians, life scientists, computational biologists, bioengineers and others interested in mathematical and computational analysis of biological systems, keep the SIAM membership informed about problems in the life sciences that seem amenable to mathematical study, and facilitate further development of mathematical methods, software and applications of mathematics to the life sciences.

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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 three years?

The field continues growing steadily. In summer of 2004, 3 well-attended major meetings (SIAM LS, SMB, and Gordon Research Conference) were held within a two-month span with probably not much overlap in attendance.

An NSF/DMS-sponsored math research center at Ohio State University was established in 2002 that is dedicated to math biology: The Mathematical Biosciences Institute. It is

analogous to MSRI at Berkeley and IMA at U Minn. The full-year emphases cover the currently very active areas of the field: Mathematical Neuroscience (2002-2003); Mathematical Modeling Of Cell Processes (2003-2004); Genomics, Proteomics, and Bioinformatics (2004-2005); Ecology and Evolution (2005-2006); Systems Physiology (2006-2007).

In addition to mechanistic modeling in these areas there are numerous opportunities for algorithmic and data analyses/statistical methodologies having to do with neural signal processing, image processing (as in fMRI), analysis of genomic and proteomic data.

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?

The activity group, still in early phases, appears to be healthy and strong. The SIAG is keeping up with changes in the field through the conferences that it organizes, and through members of the executive committee who are senior researchers. The principal activities have been the biannual meetings in 2002 and 2004. The membership is stable:

Year 2002	423
Year 2003	512
Year 2004	511
Year 2005 thus far	509

Re: reflection of broader interests of SIAM in the activities of the SIAG. The mathematical content and sophistication is deeper and more general at the SIAG conferences (and at SIAM ANs) than at many other venues for math biology, especially large conferences in the field of application (e.g., Annual Meeting of Society for Neuroscience). This reflects the broader view of applied mathematicians and value of generalization. The presentations (at SIAG LS and SIAM AN) of the biological aspects are frequently and skillfully distilled, thereby enabling non-experts to get a taste of potential areas of application for their mathematical backgrounds. The SIAG LS conferences provide opportunities for SIAM “offspring”, now dedicated math biologists (who might not have time to attend their specialist meetings as well as the SIAM ANs), to maintain contact with a larger community of applied mathematicians.

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.

SIAG LS has had two national conferences. The first SIAG conference (2002) was held jointly in Boston with the first SIAM conference on Imaging Science. The second SIAG LS conference (2004) was in conjunction with the SIAM AN meeting in Portland, overlapping for one day. Both SIAG LS conferences were lively and stimulating and covered a broad range of sub-fields. Among the major topics that were covered: Ecology, Environmental and Evolutionary Biology; Genomics; Imaging; Neuroscience;

Physiology and Immunology; Structural Biology; Modeling Diseases; Biomathematics in Industry.

Attendance:

LS02 (joint with IS02 in Boston) - 209 total LS registration

LS04 (joint with AN04 in Portland) - 341 total LS registration

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?

I do not know of any directly organized minisymposia at the most recent two SIAM ANs. However, the SIAG LS 04 conference was joint with AN04.

At many ANs there are several minisymposia on math biology that seem to emerge naturally or are encouraged by actions of the organizing committee. The same holds for the biannual SIAG Dynamical Systems conference at Snowbird.

For AN05 a lead organizer is Lisa Fauci, senior researcher in math biology. A quick count of the program shows substantial representation of math biology: 4 invited plenary speakers, including the Block Community Lecture by Chris Johnson of Utah; about 20-25 mini-symposia out of a total of 81; and at least 2 contributed sessions. Topics include cardiology, population biology, electrodiffusion, reaction-diffusion, protein structure, and traditional SIAM foci, such as numerical computing, dynamical systems, and perturbation methods, applied to biology.

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?

The SIAG LS has a website that is overseen by one of the SIAG executive committee members. It has a partial listing of members and links to member websites, current meetings in math biology, a tribute page to Lee Segel, a listing of relevant journals.

The SIAGLS does not have a newsletter nor any prizes (although see Item 6).

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

The SIAG LS 2006 is being scheduled to be held in conjunction with the Society for Mathematical Biology. It is expected that the joint conference will be held in the Research Triangle area of North Carolina in early August, 2006.

Other activities will be to increase news items and resource links on the SIAGLS webpage, consider the possible establishment of a prize in memory of Lee Segel, investigate the possibility of publishing a SIAM journal on mathematical applications in the life sciences, investigate and become pro-active in directly organizing mini-symposia at SIAM ANs, pursue the possibility of encouraging/sponsoring mini-conferences (1-2 days) on a local/regional basis, establish a liaison

for research grants with NIH and NSF, e.g. with the newly established Inter-Disciplinary Program in Mathematical Biology at NSF in the Division of Mathematical Sciences.

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

SIAM can help the SIAG LS achieve its goals by directly telling us what services SIAM can offer the SIAG. What administrative, logistical, and financial support is available to the SIAG; where are these resources/guidelines listed? Also, what pre-conference schedules and procedures must be followed in order to participate as a SIAG, say in the SIAM AN? Provide lobbying support and contact information for the discipline in terms of research grants from NIH, NSF, NASA, DOE, DOD, Howard Hughes, etc.

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

Provide excellent speakers who can give general talks on mathematical biology for the SIAM Lectureship series as well as for large interdisciplinary meetings, e.g., SIAM AN. Identify appropriate referees for math biology papers submitted to SIAM journals by means of a data base and/or through SIAG LS members as editors.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2006.

John Rinzel
Chair, SIAM Activity Group on Life Sciences
July 7, 2005