

Charter Renewal Application for the SIAM Activity Group on the Life Sciences

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on the Life Sciences (hereafter called SIAG/LS). In the fall of 1999, the SIAM Council and the SIAM Board of Trustees, under the aegis of SIAM, formed the SIAG/LS by electronic mail vote with an initial operating period between January 1, 2000 and December 31, 2002. The Council and Board have renewed the SIAG/LS charter five times thereafter. The SIAG/LS had 782 members as of December 31, 2012; of those, 318 were students.

According to its Rules of Procedure, the objective of the SIAG/LS is to foster applications of mathematics to the life sciences and research in mathematics that leads to new methods and techniques useful in the life sciences. Its proposed functions were to organize minisymposia at the SIAM Annual Meetings with scheduling coordinated by the SIAM VP for Programs and the SIAM VP at Large with the SIAG/LS Chair. Furthermore, a major function of the SIAG/LS is to organize a biennial SIAM Conference on Life Sciences.

Its purposed functions were:

The SIAG on LS will organize activities in Life Sciences. The SIAG is expected to:

1. Subject to the conditions of ARTICLES III and IV, the SIAM Activity Group on Life Sciences will conduct sessions at regular SIAM meetings, conduct special meetings, and participate in organizing publications in the areas of Life Sciences and its applications.
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 can include:

3. Organize minisymposia at the SIAM Annual Meeting in years where there is no SIAG conference.
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 triennial SIAM Conference on Applied Life Sciences. 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.

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).

M. Gregory Forest, University of North Carolina at Chapel Hill, Chair
Maia Martcheva, University of Florida, Vice Chair
Robert Guy, University of California at Davis, Program Director
Janet Best, The Ohio State University, Secretary

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 three years?

The "field" covered by the Life Sciences SIAG should broaden and deepen as the putative Century of Biology unfolds. It is evident from any number of markers that SIAM's footprint and capacity in the Life Sciences continues to expand: hiring in mathematics and statistics in academia, government labs, and the life sciences private sector is growing; publications with mathematics and statistics affiliations across the life sciences is growing, and in most cases with co-authors from topical disciplines; new funding mechanisms of the federal government and foundations are designed to promote and resource collaborations between mathematicians/statisticians and life scientists; topics at life sciences meetings and the national institutes (e.g., SAMSI, MBI, NIMBioS) continue to diversify and deepen; requirement of a modeling component now exists in many NIH funding mechanisms; new mathematical biology programs have emerged in the Department of Defense (e.g., ARO); titles of posters and lectures by students and faculty at LS Conferences. These markers indicate that our community has embraced life science as part of their scholarship and identity. We conclude that the state of the LS SIAG is healthy.

These trends toward a greater need and capacity for quantitative innovation and implementation are likely to continue. Advances in instrumentation provide greater spatial and temporal scale resolution (e.g., intra-cellular mechanisms, brain circuitry and structure) and in observational methods (e.g., tracking of populations from viral and bacterial strains to marine and terrestrial plants and animals, and real time imaging of biological function) provide new datasets to test and build models. Society has rising expectations and demands for disease and injury detection, prevention and cure, for new materials to replace body parts and organs, for drugs to combat aging, genetic disease, physical trauma, learning disabilities, and mental disease. Each advance compels new quantitative methods for analyzing data sets and the possibility for new understanding of mechanisms that can be expressed, analyzed and simulated for predictive modeling.

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?

Data provided by Susan Whitehouse and Nancy Snell show a peak membership in 2010 (870 total members comprised of 495 nonstudent, 375 student), a small downturn in 2011 (853 total, 479 nonstudent and 374 student) followed by a downturn in 2012 (782 total, 464 nonmembers,

318 student). A closer look at the data since 2006 shows the nonstudent membership is essentially on a plateau, with fluctuations within 5-10%, but the student membership dropped significantly in 2012. We will explore this with the SIAG via communication from the Chair. It is interesting to note that the membership from Statistics is very low, posing a clear direction for growth. (The historical data for membership is attached.)

4. 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 2010 LS meeting in Pittsburgh was held jointly with the SIAM Annual Meeting, as was the 2004 LS meeting in Portland, OR. The 2006 LS meeting in Raleigh, NC was held jointly with the Society for Mathematical Biology (SMB). There were no additional, officially organized or co-sponsored, workshops. Clearly the joint meetings with the SMB and SIAM Annual Meeting created spikes in attendance. Data from the SIAM office per Susan Whitehouse and Nancy Snell indicate 178 people attended the 2010 joint meeting in Pittsburgh exclusively for LS10, and 522 people indicated intention to attend both LS10 and AN10. (The historical data for meeting attendance is attached.)

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 of minisymposia at an annual meeting or meet jointly with the SIAM Annual Meeting?

The LS SIAG has not officially organized mini-symposia at the 2011, 2012 SIAM Annual Meetings, nor are there such plans for AN13. Current officers Maia Martcheva and Janet Best are planning organized LS-sponsored mini-symposia for the 2014 Annual Meeting. We request in Item 9 below a mechanism to link minisymposia at annual meetings to the LS SIAG going forward. If we want to continue the past trend of 2004 and 2010 joint meetings of the LS and AN, then we should plan now to jointly host the LS and AN in 2016. *Information from SIAM about when and whom the LS SIAG officers should contact is requested.*

6. Indicate role of officers of LS SIAG in other SIAM conferences.

Forest is Co-Chair of June 2013 Mathematical Aspects of Materials Science Conference.

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

Improvements regarding the website for the LS SIAG are being addressed with the support of SIAM (thanks to Susan Whitehouse and Nancy Snell). Janet Best has been officially designated as the LS website developer and liaison. The only prizes we have given thus far relate to posters at the LS meetings; see the activity plans below regarding prizes.

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

- a. Significant discussions have taken place surrounding the merits of a new SIAM Journal on the Life Sciences. Jon Rubin held a discussion forum at the 2012 LS meeting that revealed significant support as well as arguments against, which Jon communicated to the LS SIAG. Nick Trefethen followed up with email conversations with several folks, and Lisa Fauci raised the topic with the SIAM Board. At this point, it is clear that the positives outweigh the negatives, and a small group will proceed through the mechanisms in place to propose a new journal.
- b. The 2014 SIAM Life Sciences meeting is co-Chaired by Mette Olufsen (NC State) and Bob Guy (UC-Davis), and will be held in Charlotte, NC. Final negotiations of the venue and precise dates are underway at this writing.
- c. There is strong support for the LS SIAG to institute prizes for senior and junior level research contributions. Jon Rubin led a discussion of this at the 2012 LS business meeting. Connecting these prizes with the plenary or "mini plenary" lectures was suggested. There was no follow-up with the 2014 LS co-Chairs, which requires a formal presentation to SIAM in any case, so the aim is likely to put the prizes on schedule for the 2016 meeting. The Chair plans to appoint a LS SIAG Prize committee, following the SIAM guidelines.
- d. There has been discussion among former and current officers related to posting of educational resources through the LS SIAG website. Since NIMBioS and the MBI are involved in such activities, at the very least we will link the LS website to their events and their links to resources. We are considering a more significant effort to link to educational activities and tools from our website.

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

The officers of the LS SIAG recommend a workflow (duties, dates, reminders) for all Officers of the SIAG, to be communicated with the email that tells them they have been elected. The duties of SIAG Officers are on the SIAM website <http://www.siam.org/activity/operations.php> as well as a calendar template for all SIAGs regarding charter renewal, conferences, elections, etc. However, these two documents do not refer to one another. A conference call is arranged early in the term of newly elected officers and roles and key timelines are discussed. SIAM does a good job of communicating with the Officers for major functions like business meetings and LS Conferences. These are all helpful, yet we would like to link duties to specific dates for each Officer. Here are some specific requests / recommendations.

(i) We recommend a list of key dates and functions that each LS Officer is responsible for, given to each Officer and made available on the LS website for easy access by everyone. These dates should be incorporated into the Job Description of each Officer. Given these lists, the LS Chair can trigger reminders from their calendar, and each Officer can of course do the same. Sample questions that should be clarified in a workflow for incoming Officers, and available on the LS website are: What is the protocol for selecting the Chair of the LS Conference to team with the Program Director as Co-Chair? (E.g., does the SIAG Chair appoint the Conference Chair?) When should the Program Director or Chair of the LS SIAG trigger correspondence to Annual Meeting organizers and SIAM to link mini-symposia?

(ii) We recommend an explicit (formal) information flow between incoming and outgoing officers. Much of this information is transferred informally, rather than passed on through a

document with explicit charges. E.g., Jon Rubin contacted Greg Forest by email to ask what he could do to help, but only after getting into this charter renewal process did we trigger a core dump of all previous data and official documents. Perhaps the other suggestions in this document will address this recommendation since most of the information should be posted on the LS website. Jon Rubin passed all of his documents to Greg Forest; we asked Laura Miller (previous secretary) to pass along her recommendations and experiences to Janet Best (new secretary). I assume Tim Lewis (former Program Director) and Bob Guy (new Program Director) shared information since they are colleagues at UC Davis. All of these information passes should be automated, and indeed the last date and function of each officer should be the passing of their records and recommendations to their replacement.

(iii) As noted above, Janet Best, the Secretary of the LS SIAG, is "official editor" of the LS website. The LS Chair, previous secretary (Laura Miller), current secretary (Janet Best) and SIAM (Susan Whitehouse) are addressing website protocols and revisions to facilitate information posting and updates.

(iv) For future Annual Meetings, we propose to automate participation of the LS SIAG. Our suggestion is for an automated correspondence from SIAM to the LS Chair and the Co-Chairs of the Annual Meeting, reminding them that SIAM has in place a mechanism for submission of mini-symposia that allows the organizers to link their sessions to the LS SIAG. We recommend that this be considered for ALL SIAGs - an automatic message to the Annual Meeting Co-Chairs and all SIAGs to consider linking mini-symposia at the Annual Meeting to their SIAG, and the mechanism to do so.

10. How can the activity group help SIAM in its general role of promoting Life Sciences? The LS SIAG requests that the SIAM Council and Board of Trustees renew its charter for a three-year operating period beginning January 1, 2014.

M. Gregory Forest, Chair
SIAM Activity Group on the Life Sciences
May 1, 2013