

## CHARTER RENEWAL APPLICATION

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on Imaging Science. The SIAM Activity Group (or SIAG) to which this renewal applies was originally formed under the aegis of SIAM on December 11, 1999 by the SIAM Board of Trustees and via electronic voting by the SIAM Council in January 2000. Its initial operating period began January 21, 2000 and ended December 31, 2002. Its charter has been renewed by the Council and Board four times thereafter. This SIAG has 592 members as of December 31, 2008.

According to its Rules of Procedure, the objectives of the SIAG are to 1) provide a forum for conferences and scientific interactions between imaging science researchers and practitioners in academics, industry, medicine, and government; 2) encourage research that will provide a rigorous mathematical foundation for imaging science; 3) foster research in mathematics and computation that has the potential for solving real-world problems in imaging science, and leads to new methods and techniques useful in this subject; 4) provide the means for rapid publication and dissemination of novel methods in imaging sciences.

The SIAG will bring together researchers who seek to develop and apply mathematical and computational methods in all areas of imaging science. It will cut across disciplines to catalyze mathematical research relevant to imaging science 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 1) promote interaction among mathematicians, scientists, engineers and others interested in mathematical and computational methods that are relevant to imaging science; 2) foster cooperation on applications of mathematics in imaging science with relevant industries and Government agencies; 3) keep the SIAM membership informed about problems in imaging science that seem amenable to mathematical study; 4) facilitate further development of mathematical methods, software and applications of mathematics to imaging science, and 5) encourage the participation of graduate students in imaging science research.

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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 [two/three] years?

The role of imaging in science and industry is expanding rapidly due to new technologies (e.g., diffusion imaging such as HARDI, network tomography, two-photon imaging), new methodologies (e.g., random and compressive sensing, nonlocal processing methods), and continuing applications to movie-making, medicine, computational biology, machine vision, materials science, particle physics, remote-sensing and internet search. The importance of this activity has been recognized by the appearance of a new SIAM Journal on Imaging Science with six issues already published, and of the Inverse Problems and Imaging Journal.

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 had 592 members at the end of the last academic year, with more than half of these being students. This is a relatively young activity group and the membership represents substantial growth over the last several years (we are happy to notice an increase in the number of members from 423 to 592 in two years; also we notice a large increase in the number of student members from 168 to about 300 or even more).

Efforts have been made to advertise by e-mail the SIAG and its activities to a large number of colleagues around the world. In addition, the range of applications is expanding to include image representation as well as the more classical areas of image formation and image processing. The SIAG activities continue the educational aspect of the mission by having more student members as participants.

3. Please list conferences/workshops the activity group has sponsored or co-sponsored over the past [two/three] years, and give a brief (one sentence or phrase) indication of the success or problems with each.

The activity group sponsors the biennial SIAM Conference on Imaging Science. The last conference was held in San Diego, CA, July 7-9, 2008 in conjunction with the SIAM Annual Meeting. There were at least 500 participants. The conference included 202 mini-symposium papers, 70 contributed papers and 26 posters. A new 10 minutes lecture/poster format was introduced and tested; this format was well received by the participants. Some participants complained about the number of parallel sessions; this aspect is being taken into account for the next SIAM IS Conference.

4. Please indicate the number of minisymposia directly organized by the activity group at the last [two/three] SIAM Annual Meetings. When did the SIAG last organize a track of minisymposia at an annual meeting ?

There was considerable imaging-related activity at the recent SIAM Annual Meetings. The 2008 SIAM Annual Meeting held in conjunction with SIAM IS included: a Joint Plenary Lecture on imaging given by Jean-Michel Morel, ENS Cachan, France, titled "The Heat Equation with us Forever"; a film showing "Mind in the machine: The discovery of artificial intelligence"; Invited talk by Andrew Tomkins from Yahoo! Research titled "Directions and Challenges in Web Search"; Invited talk by James Nagy titled "Large scale inverse problems in imaging"; Invited talk by Lise Getoor from UMD titled "Graph Identification"; minisymposia on "Segmentation and data mining", "Electron microscope tomography, three dimensional reconstruction and data analysis"; contributed presentations on "Inverse problems and Imaging". The 2009 SIAM Annual Meeting includes a JP by Karl Kunisch from Graz University, Austria, on "Semi-smooth Newton methods in function spaces and applications to variational problems in optimal control and imaging"; contributed presentations on "Inverse Problems"; minisymposia "Recent advances in shape and topology optimization"; contributed presentations on "Imaging".

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 published two newsletters in April 2008 and June 2009. The SIAG/IS website has recently been further expanded, including links to a SIAM/IS mini-symposium with talk slides. The SIAG invited Michelle Miller, a student participant at the SIAM IS 2008 conference to write and publish in the SIAM News 42(3) the article "Fourth SIAM Conference on Imaging Science: A Student Perspective".

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

The main event will be the SIAM Conference on Imaging Science (IS10) to be held in April 12-14, 2010, in Chicago. The intent is to expand the range of topics to include work on semantic image interpretation and medical imaging. It is also anticipated that there will be at least one issue of the Newsletter each year as well as another article on the Imaging Science Conference in SIAM News (as in April 2009). The SIAG hopes to organize several minisymposia and even a track on imaging at ICIAM 2011 and at the next 2010 SIAM Annual Meeting.

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

SIAM awards prizes to increase the prestige of applied mathematics, to draw attention to it, to encourage research of high quality in it, and to honor those who make outstanding contributions towards these ends. The SIAG officers contemplate at the possibility of introducing a SIAM/IS prize for a scientific article published on imaging, authored

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or co-authored by a junior researcher (student or postdoctoral fellow). The AG will work with SIAM to achieve this goal.

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

The AG could work with SIAM in implementing suggestions such as those put forth in item 7.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2010.

Signed

Luminita Vese  
June 29, 2009

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