

## **Financial Mathematics and Engineering Charter Renewal Application**

This CHARTER RENEWAL applies to the SIAM Activity Group on Financial Mathematics and Engineering. 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 on 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 five times thereafter. This SIAG has 555 members, including 331 student members, as of December 31, 2013.

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

It is the purpose of the SIAM Activity Group on Financial Mathematics and Engineering to foster activity in the area of financial mathematics, financial computation, and financial engineering. Its goals are:

- To foster collaborations among mathematical scientists (including probabilists, statisticians, functional analysts interested in stochastic control and dynamic programming, numerical analysts interested in the numerical solution of parabolic PDEs), computer scientists, computational scientists, data scientists, and researchers and practitioners in finance and economics;
- To foster collaborations in those areas of research related to theory and to the development and use of mathematical and computational tools in quantitative finance in the public and private sector;
- To promote and facilitate the development of financial mathematics and engineering as an academic discipline.

Within the framework of SIAM, the SIAG will conduct activities that implement its purposes.

Its purposed functions were:

The SIAG on Financial Mathematics and Engineering will organize activities in financial mathematics. The SIAG is expected to:

- 1) Organize minisymposia at the SIAM Annual Meeting on years where there is no SIAG conference.
- 2) Organize a track of at least six minisymposia at the SIAM Annual Meeting at least once every five years. The VP for Programs and the VP at Large will coordinate the scheduling with the SIAG chairs.

Other activities can include:

- 3) Broker partnerships between academia, industry, and government. The SIAG will seek to facilitate the establishment of academic programs in FME and to foster its development as an academic and research discipline. The SIAG also will facilitate the placement of undergraduate and graduate students in internships in industry and government.
- 4) Work with other societies (such as the AMS, IMS, and INFORMS) to promote financial mathematics and engineering. The SIAG will work with other professional societies and industry

groups to promote FME. 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 FME through various outreach activities.

5) 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.

SIAG meetings, workshops, and conferences may be organized only with the approval of the SIAM president and the SIAM vice president for programs.

to which have been added:

SIAG/FME Junior Scientist Prize:

The SIAM Activity Group on Financial Mathematics and Engineering (SIAG/FME) Junior Scientist Prize, established in 2010, is awarded to an outstanding junior researcher in the field of financial mathematics for distinguished contributions to the field in the three calendar years prior to the year of the award.

SIAG/FME Student Prize

This prize is awarded by the SIAM Activity Group on Financial Mathematics & Engineering (FME). It aims to recognize outstanding research presented by students and/or postdocs at the biennial SIAM conference on FME. Up to six finalists will be selected to present their work and up to two awards are made at each conference; each award has equal merit and each winner receives a \$200 prize. It was established in 2014.

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).

- Chair: Ronnie Sircar, [email](#)(1/1/13 - 12/31/14)
- Vice Chair: Kay Giesecke, [email](#)(1/1/13 - 12/31/14)
- Program Director: Sebastian Jaimungal, [email](#) (1/1/13 - 12/31/14)
- Secretary: Michael Ludkovski, [email](#) (1/1/13 - 12/31/14)

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 two years?

The interface between mathematical modeling and finance has never been as active as it is now: the recent financial crisis has focused great attention on the importance of [fn](#) the modeling, measurement and management of financial risks, as well as the need for better tools in this field, in particular in relation with issues regarding systemic risk and financial regulation. As a result, the field has been greatly expanding its scope beyond its traditional focus on derivatives pricing and hedging; new topics for research, such as

- modeling of liquidity risk
- measurement and modeling of systemic risk and financial instability phenomena
- energy and commodity markets
- high frequency financial data and limit order markets
- model uncertainty and its impact in risk management

have emerged and are being actively pursued by SIAG members and other researchers worldwide. Overall, the focus has shifted from detailed analytical modeling of derivatives to large-scale models (large portfolios, systemic risk) and large and complex data (high frequency data, limit order books, interbank networks) which present computational challenges and stronger links with economics/ finance theory. Significant advances have been made in these topics, which were little explored previously by mathematicians but which now have become the focus of a lot of recent research, much of it presented at the SIAM FM12 conference, and published in the SIAM Journal on Financial Mathematics. A lot of young researchers are also making significant contributions to problems from Mathematical Economics, Equilibrium Theory and Dynamic Games, motivated by the structure of modern markets.

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?

SIAG FME has become SIAM's outlet to the very active field of quantitative modeling in finance and succeeded in attracting a broader audience to SIAM's membership and SIAM events.

The activity group is as vibrant as before with a large number of members, including a high percentage of students. Membership includes a substantial fraction of European members (the field is well represented in Europe) and practitioners from the financial services sector (banks, insurance, asset management, regulatory bodies) which creates a good mix at SIAG events, well attended by all categories.

The flagship journal associated with the SIAG FME (SIAM Journal of Financial Mathematics) has established itself as a high quality mainstream journal at the interface of applied mathematics and finance.

The SIAG FME Conference has established a reputation as one of the best conferences in this field and perhaps the only conference where a broad range of mathematical topics are represented alongside many talks of practical interest for industry professionals.

SIAG FME has responded to the changes in the field (see above) by creating minisymposia on novel topics at SIAM FME conferences and at ICIAM. SIAG FME members have responded equally well by submitting contributions related to the emerging topics of the field, making SIAM FM12 quite representative of the current state of the field, which is very satisfactory.

There is already great interest in FM14 that will take place in Chicago in November '14, with almost 40 minisymposia proposals and 90 contributed talk submissions.

The size of the SIAG membership remains healthy, although there has been a drop in the number of students, which we shall try and address now we are aware of the new numbers.

4. 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.

SIAG Financial Mathematics and Engineering organizes the biennial conference on Financial Mathematics and Engineering . This list of conferences may be found at: <http://www.siam.org/meeting/archive.php#fm>. The SIAM Conference on Financial Mathematics and Engineering in 2012 (joint with the Annual Meeting) had 1103 attendees. About 300 participated in the FME part of the meeting.

The next meeting will be held in November in 2014 with 10 plenary lecturers, including one of last year's Nobel Prize in Economics recipients. The submission numbers, as given above, are very strong.

We also initiated a SIAM-SMAI collaboration (SMAI is SIAM's French counterpart). The SIAG is jointly sponsoring a 4-day conference in Paris in June 2014, with 35 invited speakers and over 100 registrants. We are pleased to be part of the first SIAM-SMAI joint venture.

The SIAG also continues to co-sponsor some of the workshops and occasional conferences in quantitative modeling and financial mathematics, such as Rutgers Mathematical Finance and Partial Differential Equations Day (Nov 1, 2013).

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

FM12 was joint with the Annual Meeting. This included 30 invited Minisymposia as well as 13 Contributed Sessions.

A former FME SIAG Chair will be a plenary speaker at AN14.

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

In 2013 we initiated a newsletter sent on the SIAG mailing list and published online on the SIAG wiki every few months. We sent the 2<sup>nd</sup> edition out in May 2014. The newsletters have received positive feedback from members.

We established a new student prize for FM14, to be contested and awarded this November.

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

#### Organization of FM16.

A practitioners' conference, open to all, but with speakers from industry. These are held by profit-making conference firms with huge registration fees. One SIAG member proposes to initiate a cheaper and more open such conference.

Discussion of accrediting Masters in Financial Mathematics programs. Many programs are set up without being modernized to current research and events, and sit on the back of existing courses. One service the SIAG can offer to the community is accrediting or reviewing these Master programs.

Participation in ICIAM 2015 and organization of minisymposia there as the SIAG did for the ICIAM meetings in 2007 and 2011

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

Renewal of the SIAG charter.

Advice on the potential accreditation program.

Development of corporate relations for sponsorship of FM14 and future meetings.

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

The SIAG FME has contributed to SIAM's general goals by

- promoting SIAM membership and SIAM meetings to a broader audience including researchers and students involved in mathematical modeling in finance as well as industry professionals and finance academics

- promoting the use of mathematical models and methods in finance and enhancing the visibility of research done by SIAM members to this wide audience

- establishing the importance of SIAM as a serious player and partner for dialogue with industry and government in issues related to the use of mathematical models in risk management and finance.

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

Ronnie Sircar,

Chair, SIAG Financial Mathematics and Engineering  
2 June, 2014.