

## CHARTER RENEWAL APPLICATION

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on Analysis of Partial Differential Equations (SIAG/APDE). The SIAG/APDE was originally formed under the aegis of SIAM on December 7, 2002, by the SIAM Board of Trustees and on March 26, 2003, by the SIAM Council. Its initial operating period began April 1, 2003, and ended December 31, 2004. Its charter has been renewed by the council and board three times thereafter. This SIAG has 682 members as of December 31, 2009.

According to its Rules of Procedure, it is the purpose of the SIAM Activity Group on Analysis of PDE to foster activity in the analysis of partial differential equations (PDE) and to enhance communication between analysts, computational scientists, and the broad PDE community. Its goals are:

- To provide a forum where researchers in the area, theoretical and applied, can meet;
- To be an intellectual home for researchers in the analysis of PDE;
- To increase conference activity in PDE;
- To enhance connections between the applications and analysis communities.

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

Its proposed functions were to undertake a number of activities, including:

1. Organize minisymposia at the SIAM Annual Meeting in years when there is no SIAG conference.
2. 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.

Other activities can include:

3. Organize a biennial SIAM Conference on PDE. Because of connections between PDE and the topics of many of the other SIAGs, the SIAG/APDE will also solicit opportunities to run joint meetings with other SIAGs and with other periodic SIAM meetings (for example, Combustion, Materials Science, or the SIAG on Nonlinear Waves and Coherent Structures). 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.
4. 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.
5. Disseminate information. The SIAG will publish a newsletter and maintain a website to facilitate the exchange of information among its members and other interested parties.

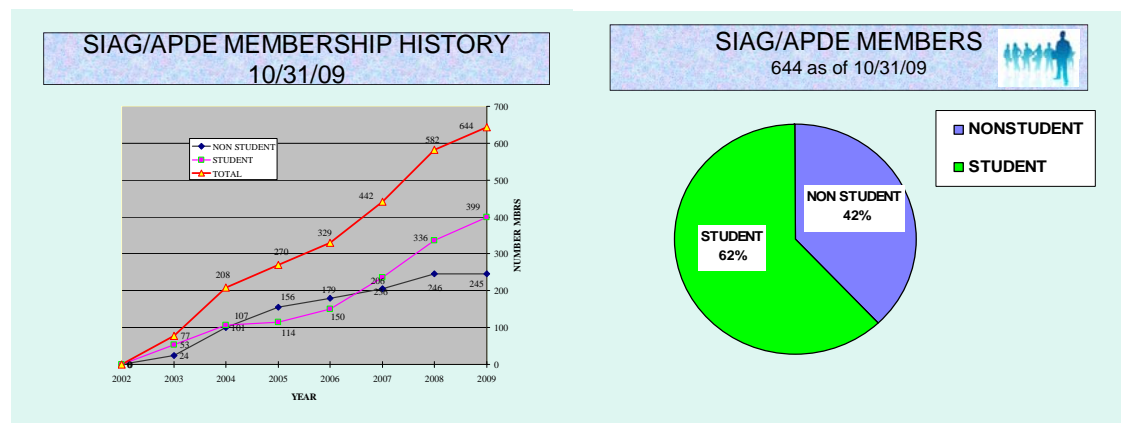
The SIAG/APDE has complemented SIAM's activities and supported its proposed functions. The answers to the questions below indicate how this was accomplished and what the officers propose as the future directions for the SIAG.

**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 SIAG/APDE is growing in developing activities, broadening its scope, and this should continue. Its scope comprises the applied analysis associated to modeling by Partial Differential Equations and related forms from several areas from life and social sciences. The wide scope of subjects in the 78 minisymposium sessions in its December 09 meeting is a testimony of their continuous fast growth and breadth.

**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 SIAG/APDE has grown an overall 69% in membership in the last 2-year period, with a very significant increase of student membership now reaching 62% of the members (see charts as of October 31, 2009, below). It represents a very vibrant group with a strong participation in planned activities.



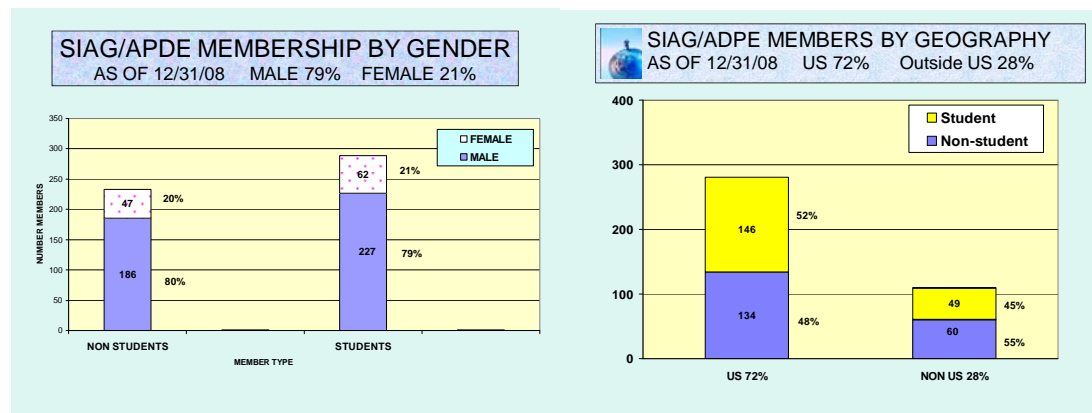
In order to keep up with the changes in the field, we strongly encouraged participation and organization of minisymposium sessions in our last meeting, covering the analysis and simulation of nonlinear phenomena in areas from quantum, kinetic and classical macro mechanics, as well as integrating innovative developing fields such as interacting complex particle systems in quantum and kinetic theories, multiscale phenomena in material and biological sciences, climate and oceanography, mathematical finance, image processing, homogenization and uncertainty quantification, advances in calculus of nonlinear variations with applications to broad areas in material sciences such liquid crystal or foam modeling, superconductivity, geometric flows, etc.

The SIAG/APDE serves a section of the SIAM membership that has not had a clear role in SIAM in the last decade or so. Bringing this community into the mainstream of SIAM activities will benefit broader SIAM interests in connecting with the areas of mathematics that interface with applications. As of December, 2009, the SIAG had 682 members, including more than 399 (about 62%) student members.

The total membership has increased by about 69% in the 2-year period. This percentage shows a continuous considerable increase in membership numbers, in comparison with the increase was about 65% in the period December 2005-2007 and 45% in the initial two year period December 2003-2005.

In six years, the SIAG/APDE group has achieved membership numbers comparable to SIAG groups LA, CS, FME, and IS, with a significant student membership percentage second to FME, which has the largest student membership percentage of any activity group.

The following two charts show the current distribution of membership by gender and by geography, which show a healthy membership support amongst academically junior people.



**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.**

Over the past three years, the SIAG/APDE has had three conferences.

The first one was held in Mesa, Arizona, December 10 to 12, 2007. The conference had more than 280 paid attendees, 9 plenary lectures including the Prize lecture, and 69 concurrent sessions in three days. Scheduling was an intense 8AM to 8PM, which made for a very long three days. It was a successful meeting.

The second conference was held in Miami, Florida, December 7 to 10, 2009. The conference had more than 280 paid attendees, 9 plenary lectures including the Prize lecture, one Minututorial course offered by Luis Caffarelli, and 88 concurrent sessions in 3.5 days. Since enthusiastic submissions of the proposal for minisymposia and contributed presentations, the originally planned 3-day conference was extended to 3.5 days. The meeting was again a great success with truly high scientific quality.

The SIAG/APDE jointly organized the Joint SIAM/RSME-SCM-SEMA Meeting on Emerging Topics in Dynamical Systems and Partial Differential Equations (DSPDEs'10), May 31-June 4, 2010, in Barcelona, Spain. This conference was devoted to fostering the interaction between the SIAG/APDE and SIAG/DS with the Catalan and Spanish mathematical societies and [RSME](#), [SCM](#), and [SEMA](#) and the European applied mathematical community in general. The conference had special emphasis in stimulating new promising research lines in PDEs and DS, encouraging bridges between academia and industry. Modelling, theoretical analysis, numerical analysis and simulation are the methodological core of these fields. Minisymposia and contributions in all these strategies were encouraged, particularly those who used them in a unifying way.

**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?**

The SIAG/APDE did not organize a minisymposia track at an annual meeting before 2010. We have organized a track of minisymposia for the 2010 SIAM Annual Meeting. There will be 7 minisymposia directly organized by the activity group for the 2010 SIAM Annual Meeting. The current or incoming elected program officers for the period 2011-2012 will continue to nominate a person who will organize a track of SIAG/APDE minisymposia, and be nominated to serve on the Organizing Committee for AN12. We are planning to track the number of minisymposia directly organized by the members of SIAG/APDE for the ICIAM 11.

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

There has been one newsletter in April 2009.

The first [\*SIAG/Analysis of Partial Differential Equations Prize\*](#) was made at the 2006 SIAM Conference on Analysis of Partial Differential Equations in Boston in July, 2006, to [Francois Golse](#) and [Laure Saint-Raymond](#) for their paper, "The Navier-Stokes Limit of the Boltzmann Equation for Bounded Collision Kernels," *Inventiones Mathematicae*, Volume 155, Number 1, 2004.

The second [\*SIAG/Analysis of Partial Differential Equations Prize\*](#) was awarded at the 2007 SIAM Conference on Analysis of Partial Differential Equations in Mesa, Arizona, in December 2007, to [Stefano Bianchini](#) (SISSA-ISAS, Italy) and [Alberto Bressan](#) (Pennsylvania State University) for their paper "Vanishing Viscosity Solutions of Nonlinear Hyperbolic Systems," *Annals of Mathematics*, Volume 161, Number 1, 2005.

The third [\*SIAG/Analysis of Partial Differential Equations Prize\*](#) was awarded at the 2009 SIAM Conference on Analysis of Partial Differential Equations in Miami, Florida, in December 2009, to [Chongsheng Cao, Florida International University, and Edriss Titi, University of California-Irvine and Weizmann Institute of Science \(Israel\)](#), for their paper "Global Well-Posedness of the Three-Dimensional Viscous Primitive Equations of Large Scale Ocean and Atmosphere Dynamics", *Annals of Mathematics*, Volume 166, Number 2, 2007 (*Ann. of Math.* Volume 166, Number 2 (2007), 245-367). The prize was received by both Chongsheng Cao and Edriss Titi, and Edriss Titi delivered the prize lecture at a plenary session on Wednesday, December 9, 2009. The prize committee included Chair Patricia Bauman (Purdue University); Fang-Hua Lin (New York University); Ricardo Nochetto (University of Maryland); Michael Shearer (North Carolina State University); and Vladimir Sverak (University of Minnesota). More information can be found at <http://www.amsc.umd.edu/siam/prizes.html>

The current SIAG website is jointly maintained by SIAM administration and the group. It maintained a linked website at the University of Texas at Austin until June 8, under the supervision of the previous Chair and current Program Director, and has maintained a linked website:

<http://www.amsc.umd.edu/siam>

at the University of Maryland at College Park, under the supervision of the current group Secretary since June 9.

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

Continued communication with the SIAM membership to emphasize the benefits and low cost of joining the APDE/SIAG. Chairs or Program Directors of the SIAG should contact the Annual Meeting organizers to ask about sponsorship of minisymposia by the SIAG/APDE, and should use the newsletter or email to solicit minisymposia from the membership.

Newsletters should be coordinated between the Chair and Secretary of the SIAG/APDE.

It was proposed that the SIAG/APDE meetings remain biannual, with the next one planned for November 14-17, 2011, in San Diego, California. A track of minisymposium will be organized at the 2012 SIAM Annual Meeting.

There has been preliminary discussions among SIAG/APDE group officials/ members and SIAG/MS group officials/members to organize a joint Meeting with SIAG/MS to foster the increasing interactions between the two SIAG groups as either an additional activity of the group or a Joint Biannual Meeting 2013.

Continue to solicit suggestions and opinions from the members for establishing an additional SIAG/APDE Prize. Two proposals are under consideration: One proposal is to establish a Prize for Best PhD Thesis in PDE which is defended within 5 years before the prize is awarded. Another proposal is to establish a Prize for Life-Time Achievements/Contributions by delivering a distinguished lecture at the Biannual SIAG/APDE Meeting.

Continue to promote international joint meetings for one or more SIAGs together in order to foster joint international activities. Already the last SIAG/APDE conference in December 2009 had significant (about 28%) participants from foreign institutions. Several of these participants are already SIAG/APDE members. The SIAG/APDE has successfully organized the Joint SIAM/RSME-SCM-SEMA Meeting on Emerging Topics in Dynamical Systems and Partial Differential Equations (DSPDEs' 10), May 31-June 4, 2010, in Barcelona, Spain. Similar efforts should be continued.

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

The APDE/SIAG does this by remaining an active organization, showcasing exciting new developments in the field. Awarding prizes is an important activity of our professional organization, and the SIAG/APDE prize has played its part in promoting SIAM interests. It will be very helpful to establish another SIAG/APDE prize as described above to achieve the goals.

Given the distribution of membership by employers, the group is in a great majority of academic members (85%). In terms of the distribution of the departments for the membership, the group is also in a great majority of the departments of mathematical sciences. SIAM may help by promoting the SIAG/APDE membership to its non-academic members and members who are from non-mathematical sciences departments. That would make the group more diverse in scope and goals, and may help their members to keep focus on innovations from emerging technologies from life and social sciences and statistical modeling.

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

The SIAG/APDE brings an analytical vision to SIAM that focus fundamentally in the interactions of applied analysis and scientific computing. It comprises a broad group of active research scientists, 85% in academia, fostering the links between fundamental analytical issues of nonlinear modeling in current natural and social sciences. An attainable goal for SIAG/APDE is to keep on bridging the interactions between academics in Applied Analysis and Numerical Mathematics and innovative developing technologies at industry and research labs. Such interactions will increase the support of our group community in the form of funding and endorsement of research and SIAM activities as a whole.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two-year operating period beginning January 1, 2011.

Signed  
Gui-Qiang G. Chen, SIAG/APDE Chair, 2010-2011

On behalf of SIAG/APDE officers,  
Vice Chair: Lawrence Craig Evans

Program Director: Irene M. Gamba  
Secretary: Konstantina Trivisa

June 8, 2010

**Acknowledgment.** We would like to thank Allison Bogardo, Linda Thiel, and Susan Whitehouse for their contributions to this application, specifically the data graphics that were available to us for the Business meeting of December 2009, and the records of our activities available to us for the purpose of this application.