

## **SIAG Analysis of Partial Differential Equations Charter Renewal Application**

This CHARTER RENEWAL APPLICATION applies to the SIAM Activity Group on Analysis of Partial Differential Equations. The SIAM Activity Group APDE 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. Its initial operating period began April 2003 and ended December 31, 2004. Its charter has been renewed by the Council and Board nine times thereafter.

This SIAG has 848 members, including 492 student members, as of December 31, 2021.

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

It is the purpose of the SIAM Activity Group on Analysis of PDE to foster activity in the analysis of partial differential equations (APDE) and to enhance communication between analysts, computational scientists and the broad APDE 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. In particular, to foster interdisciplinary research that stems from analysis of PDE.

Within the framework of SIAM, the SIAG will conduct activities that implement its purposes. The SIAG on APDE will undertake a number of activities, including:

1. Organize a biennial SIAM Conference on Analysis of 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, Materials Science, Nonlinear Waves and Coherent Structures, and Computational Science and Engineering). 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.
2. Disseminate information. The SIAG will maintain a website to facilitate the exchange of information (conferences, summer schools, job announcements) among its members and other interested parties
3. Award the SIAG Analysis of PDE Prize, established in 2005, to the author(s) of the most outstanding paper, as determined by the Prize Selection Committee, on a topic in Partial Differential Equations published in English in a peer-reviewed journal bearing a publication date within the four calendar years preceding the year of the award.
4. Organize minisymposia at the SIAM Annual Meeting in years where there is no SIAG conference.
5. At least once every seven 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.

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

List all current officers of the activity group.

Chair: Michael Weinstein

Vice Chair: Maria-Carme Calderer

Program Director: Siddhartha Mishra

Secretary: Mikaela Iacobelli

## Questions for SIAG APDE Charter Renewal 5/19/2022

Chair: Michael Weinstein

Vice Chair: Maria-Carme Calderer

Program Director: Siddhartha Mishra

Secretary: Mikaela Iacobelli

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 years?

**The field of Analysis of Partial Differential Equations continues to be of great importance in field's related to its origins in continuum physics (fluid mechanics, elasticity, electromagnetism, kinetic theory, and wave physics with applications to fundamental and applied physics and engineering) as well as in biology (from modeling of cells to epidemiology), economics and the social sciences. With the growing importance of statistical ideas and, in particular, machine learning, there is increased interest in *physical model–constrained* machine learning to merge data-driven and first principles PDE model-driven approaches.**

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?

**SIAG/APDE is very active and doing well. Its membership comes primarily from universities, and there is a strong student component to the membership. Membership has been reduced, to some degree due, to the pandemic and the substitution of online activities for in-person meetings, but membership is expected to rebound going forward.**

3. 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 APDE – PD22 was originally scheduled to be held in Berlin, Germany in 2021. Due to the pandemic it was delayed and held online March 14-18, 2022. Attendance : 523, Preregistered: 508.**

**Excellent broad APDE meeting.**

**Plenary speakers (Carrillo, Colombo, Dalibard, Giga, Lowengrub, Malinnikova, Shatah, Sonnendrueker).**

**Prizes were awarded for Best Paper in APDE (Bresch and Jabin) as well as the Early Career Prize (Canevari).**

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

*\*Because of the number of Activity Groups, the current guidelines are that an Activity Group should organize a track about every seven (7) Annual Meetings or meet jointly with the Annual Meeting within a seven (7) meeting period. \**

**The last time SIAG/APDE organized a track at the Annual Meeting was 2016. SIAG/APDE did not formally participate in the previous two SIAM annual meetings but was well represented otherwise. APDE will look into organizing a track at Annual Meeting over the next officer term.**

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?

**Prizes:**

- 1) Best Paper in APDE (Bresch and Jabin)**
- 2) Early Career Prize (Canevari).**

**Webinar:**

**The SIAG APDE webinar, , initiated during the pandemic, is held on the first Thursday of every month at 11:30am (ET) except for January and August. Alternative talks of type I and type II. Type I talks are broad vision talks given by well-established leaders in the APDE community. Type II talks are based on a recent excellent paper published in the SIAM J on Math Analysis (SIMA). The webinar is a collaboration of SIAG APDE and the editorial board of SIMA. Current organizing committee: G-C Chen, J Mattingly, A Mazzucato, F Otto, H Nussenzweig Lopes (Chair), C. Sulem, A. Vasseur**

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

**We shall continue the very successful SIAG APDE online webinar.**

**SIAG APDE Conference, PD24, to be held in 2024. Location: TBD. (We are moving to even year PD meetings because PD21 / Berlin was postponed due to the pandemic and instead was held online as a virtual conference in March 2022)**

**SIAG APDE Prizes – Best paper and Early Career – call for nominations will be in May 2023 in preparation for PD 2024**

**One possible activity to be considered is the initiation of PDE and analysis courses to be delivered via zoom for advanced (MS, PhD level) students. This would be directed at students in locations where there's a paucity of instruction in applied analysis and PDE beyond, say, advanced calculus, e.g., in certain countries, at smaller institutions, or institutions that serve under-represented groups in math, science, and engineering. This could have the format of summer reading courses, with advanced undergraduate analysis being a key component. The organizers who undertake such an initiative would coordinate volunteer instructors who would deliver only a few of such lectures. SIAM could play an important role in the publicity and other aspects of such programs.**

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

**SIAM is doing an excellent job promoting SIAG/APDE in many ways. We recommend that SIAM facilitate a hybrid format for at least some aspects of the SIAG/APDE meeting (e.g., plenary talks, tutorials), in order to achieve participation from outside North America and Western Europe. Working with the relevant mathematical societies, e.g., the African Mathematical Union, would help bring attention to SIAM and SIAG meetings.**

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

**The activity group can help researchers in the area connect and create new collaborations through webinars, meetings, and seminars. Also, we could try to encourage more and more young researchers to be active and post on the platform Engage for promoting events, job advertisements, and prizes. This engagement at the local level will positively affect the image of SIAM, promoting multidisciplinary collaboration with other groups in SIAM.**

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a two- year operating period beginning January 1, 2023.

Signed,

Michael Weinstein  
May 23, 2022

