

## **SIAM Activity Group on Mathematics of Planet Earth Charter Renewal Application**

This Charter Renewal Application applies to the SIAM Activity Group on Mathematics of Planet Earth (hereafter referred to as SIAG/MPE). The SIAG/MPE to which this renewal application applies was formed under the aegis of SIAM and approved by the SIAM Council and SIAM Board of Trustees on December 19, 2014, for an initial operating period beginning on January 1, 2015, and ending on December 31, 2016. This is the fourth application for renewal of the SIAG charter.

This SIAG has 405 members, including 215 student members, as of December 31, 2021.

The purpose of this SIAG is to provide a forum for mathematicians and computational scientists to study Planet Earth, its life-supporting capacity, and the impact of human activities. By opening up a new area of applications, the SIAG shall stimulate interesting research in the mathematical sciences. The SIAG shall conduct its activities within the framework of SIAM.

To implement its purpose, the SIAG/MPE shall organize the following activities:

1. Organize a minisymposia at the SIAM Annual Meeting and The International Council for Industrial and Applied Mathematics (ICIAM) in years where there is no SIAG Conference.
2. 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.
3. Organize a biennial SIAM Conference on Mathematics of Planet Earth. 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.
4. With the approval of the SIAM Program Committee, the SIAG may organize special sessions at SIAM meetings. 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.

List all current officers of the activity group (including advisory board, if relevant).

Chair: Katherine Evans

Vice-chair: Carrie Manore

Secretary: Olga Vasilieva

Program Director: Jessica Matthews

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 is clearly growing, as evidenced by more funding from U.S. funding agencies, (e.g., the National Science Foundation and the Department of Energy (DOE)) in the areas of climate research, urban impacts, environmental modeling, and simulation and data sciences. One example is the U.S. DOE Biological and Environmental Research proposal call for Urban Field Laboratories, which among other things, asks for new research into modeling climate change and its impacts across urban regions.

The SIAG contributed to a report, *Research and Education Priorities to Address Climate Change, Boost Environmental Resilience, and Advance Clean Energy*, and a recent offshoot focused on renewable energy research. This report led to SIAM MPE's representation on multiple panels at large conferences sponsored by related organizations, including the Global Sensitivity Analysis, American Geophysical Union, and The American Mathematical Society.

We instantiated a new early career award for the SIAG in 2021, which was started by the previous SIAG officers. Although it did not have the required three nominations this year, we expect more success in the next round as visibility for the section and the award grows. Our overall MPE prize was awarded to Valerio Lucarini from the University of Reading, United Kingdom, and he will present at the SIAM 2022 Conference on MPE.

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?

Although membership has decreased slightly, we do not believe this is a long-term trend, as our last conference went virtual with little planning at the start of the pandemic, and that is typically when we gain new members and renewals. We want to take advantage of the period as we emerge out of COVID to grab lapsed and new members. We plan to write a note to lapsed members to encourage them to register for SIAM MPE22.

We have continued an active DropBox account for the SIAG officers to share and store information such as text for newsletters and other public, membership and committee lists, access to social media accounts, etc. This is very useful for the officers as they transition every two years and makes it easy for them to be active and organized in running the SIAG.

The officers have met monthly on zoom throughout their service period. We find this has worked well in moving activities forward and spreads the work nicely among all the officers. This SIAG chair has been so grateful for the input and efforts of the other SIAG officers; it has truly been a team effort.

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.

The last conference held, MPE20, took place in August 2020 and was abruptly shifted from in-person to virtual. Despite the logistical challenges, the conference was still successful, with more than 200 participants, on par with participation at previous in-person MPE events. In fact, given the particular sensitivity of members in this SIAG to issues like carbon footprint, many appreciated the opportunity to participate virtually, which was unprecedented before 2020.

We are currently in the final stages of planning the SIAM biannual Conference on MPE on July 13-15, 2022, to be held jointly with the SIAM Annual Meeting in Pittsburgh, PA, July 11-15, 2022, and the SIAM Conference on Life Sciences, and the SIAM Conference on Applied Mathematics Education. This combination of conferences was instantiated in 2020 but was not able to come to fruition as it was moved to virtual just as registration began. We hope to realize the synergy of these related SIAGs and leverage all of the recent interdisciplinary work in the areas of COVID, climate change, and the education of these topics to the next generation of applied mathematicians.

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

The SIAM 2021 Annual Meeting had three mini-symposia in the area of MPE, and two had multiple sessions: MS29/40, MS31, and MS37/50/60/85. In addition to the mini-symposia one of our members, Lea Jenkins, presented a plenary at the SIAM Annual 2021 Meeting. There was also a contributed session in epidemiology and ecology.

This activity group is seven years old, and we are excited that this year is our first biannual MPE conference meeting to be co-hosted with the 2022 annual meeting, with details provided above. In addition to our full conference with 27 mini-symposia, six contributed talks sessions, two mini-tutorials, six plenary speakers, and the MPE Prize Lecture, we are proud to host a joint AN22/MPE22 plenary speaker for this weeklong event. As for ICIAM, the next one is planned for 2023, and the event will open soon for mini-symposia submissions. We are actively soliciting members to consider submitting for this conference.

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?

We are working to grow our impact online by posting on Twitter @MathEarthSIAM, SIAM Engage, and the SIAM Engage blog. The Twitter account is small, but we hope that active tweeting during the conference will help increase membership. As for Engage, we have been receiving about 2-4 postings monthly. The major topics are job openings (Ph.D. and Postdoc positions in particular projects or institutions), academic events, conferences, and other professional event announcements (calls for abstracts, deadlines reminders for submission, travel support, registration, etc.), and information regarding the SIAM prize and calls for nominations. We also use it to post a periodic SIAG newsletter since it reaches the same audience.

The blog version of SIAG does not yet have a measurable following. We have sent out a Request for Information to gather information to post to the blog. Currently, the SIAM Engage blog area is hard to find and link to.

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

Although we instantiated SIAG an Early Career Prize, we will need sustained communication to make sure we get enough nominations to award the prize, so efforts to increase nominations should continue in the next charter period. This prize is especially significant for this activity group because of the large percentage of early career members.

Because the SIAG conference and its connection to the annual meeting are happening this year, the planning of the next conference and activities for the next annual meeting will not start until after they are complete, in the fall of 2022. However, our DropBox of all our activity is available to assist in the transition of information from the current conference for use in the new officers in planning the next round in two years.

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

The SIAM report on research and education priorities to address climate change, environmental resilience, and advance clean energy was impactful in the scientific and policy community, and it led to some visibility for the SIAG. We thank SIAM for including the SIAG leaders in this report, and we hope that more of these opportunities are possible for which we can contribute.

The blog feature needs more public visibility than Engage can provide. Is there an overall SIAM presence in social media that can amplify blogs from the SIAGS?

During COVID, we did not have regular SIAM meetings with the SIAG chairs, so it is good that those meetings have resumed. It is a useful way to communicate.

We have solicited members to contribute to the blog post by sharing their research highlights. The hope is that both our members and the SIAG will benefit from the additional visibility, but we have had no solicitations yet. Perhaps SIAM has ideas on how to convince members to make their research more visible?

We have not used (and were not aware of until very recently) the SIAG advisory committee, so that does not need to continue unless the new officers would find it useful.

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

We appreciate all that SIAM has done for us during a very unique time. We hope that SIAM can use the MPE's unique areas of application to problems facing the Planet Earth to increase the visibility and impact of applied mathematics and computational science. They should feel free to engage more with SIAG MPE to tell those stories and motivate more investment, training, and education in those areas.

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,

Katherine (Kate) Evans, SIAG/MPE Chair

5/19/2022