Session: 1725

# Running an Undergraduate Research Conference

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## Abstract

Independent research and design is a critical component of engineering education, yet undergraduates often have few opportunities to showcase their work. It can also be difficult to convey their experiences succinctly on a resume unless they publish or present their design. In order to provide a forum to communicate and celebrate undergraduate student achievement, many universities have created undergraduate research conferences. The primary goal of these conferences is the promotion of undergraduate research, scholarship, and creative activity performed in partnership with faculty or other mentors. A secondary goal is to help faculty discover new and more sophisticated ways to incorporate undergraduates in research and to encourage students to undertake research projects of their own.

In this paper we describe how to create and direct a first-time undergraduate research conference. Specifically we examine the steps of planning, budgeting, forming and managing the necessary subcommittees, raising interest among potential presenters and attendees, managing abstract submissions, and orchestration of the conference event itself. We also describe some of the pitfalls that can occur to first-time conference organizers, their solutions, and how to use the existing infrastructure of the school to reduce staffing requirements.

## Introduction

The number of undergraduate research conferences has exploded in the past decade for a variety of reasons. Recommendations from academic leaders[1,2,3,4] to establish more opportunities for meaningful undergraduate research experiences have increased the need to create venues that allow students to present their work. Further, quantitative studies[5,6] measuring the success of such undergraduate conferences are beginning to appear and the results are spurring more universities to develop similar programs. My research involving a random sample of 50 undergraduate research conferences sponsored by individual and consortiums of universities show a rise in the rate of the creations of such conferences (Figure 1). These conferences are typically too small to justify the expense of professional conference management; the average size of those surveyed was 257 participants (presenters plus viewers). Yet the budget needed to inaugurate such an event can be substantial and the burden of directing one often falls on an assistant professor with little prior conference management experience. This paper outlines effective strategies to help a faculty director plan and execute an inaugural undergraduate research conference.

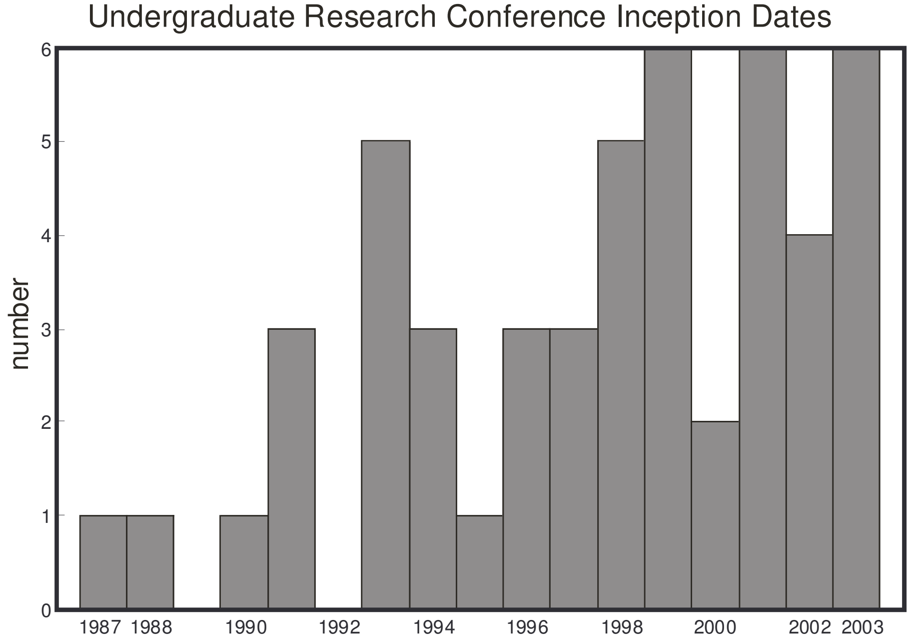


Figure 1: A random sample of 50 undergraduate research symposia; all in the sample began in the past 16 years and trend towards increasing numbers. They range in size from a minimum of 27 participants to approximately 2500. Most are run by individual universities, although several are run by university consortia and honor societies. All are directed by faculty.

The conference planning schedule can be organized into five chronologically-ordered phases (Figure 2), to which the director's time commitment is tightly coupled: advance planning, abstract submission, preproduction, the conference event, and after-action. We assume as a starting point that a decision to create an undergraduate research conference has been made and a director has been appointed.

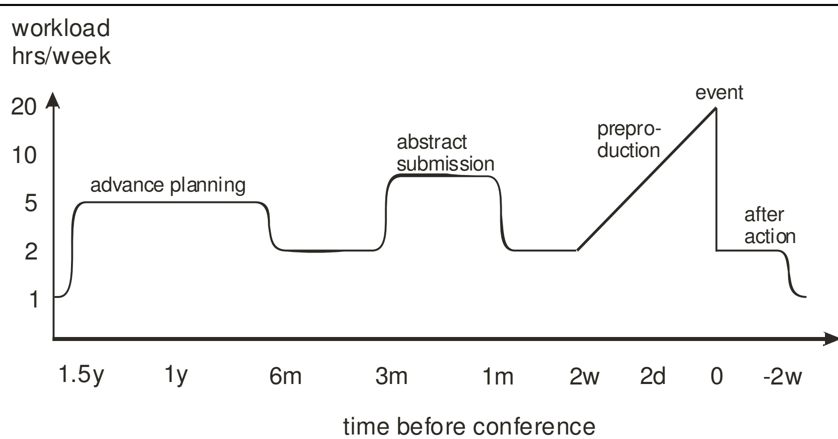


Figure 2: Five phases of the conference planning, graphed against the director's time commitment. The workload is, unfortunately, on a logarithmic scale.

Advance Planning

Initially the director must clarify the conference objectives, and use these to develop a budget. What is the desired percentage of undergraduates that will present? Are equal showings in the fine arts, social sciences, hard sciences, and engineering desired? These decisions will drive the budget, committee selections, venue, and public relations to generate student support. For reasons that are unclear, unless a decision is made to encourage inclusiveness, we have found representation at undergraduate conferences often tend to favor science departments, especially chemistry and biology, and tend to have fewer submissions from the fine arts.

*Budget*
The budget consists of both non-reoccurring (e.g. posterboard purchase) and reoccurring costs. Since the conference is for the students, it is most reasonable to hold it on campus, simplifying transportation and eliminating the cost of renting a hall. The budget presented below further assumes the work is conducted by faculty committees (i.e. there are no management or personnel expenses). The expenses listed are a rough guide, prepared using the data from the Virginia Military Institute in 2001 as a sample.

Printing
- Brochure printing $0.75 ea, for a double-sided glossy color trifold
- Conference schedule printing $2.00 ea, for a B&W 30 page 8.5x11 with cardstock cover
- Judge/VIP/presenter name cards $0.75 ea
- Postage
- Paper (e.g. Judging sheets, awards, thank-you cards)
- Miscellaneous printing costs (e.g. single-page flyers)

Keynote speaker
- Honorarium $1000
- Travel $1000

Catering
- Kickoff meal (e.g. lunch) $8 ea
- Awards banquet meal $15 per
- Awards banquet table decorations $20 per table

Gifts
- e.g. T-shirts $12 ea + $60 setup
- Prizes $1000+$500 +$250 ($1^{st}$-$3^{rd}$) x3 (liberal arts, science, engineering)

Presentation costs
- Posterboards $5 to $75 ea (see below – one time expense)
- A/V support $100

*Steering Committee*
The steering committee should ideally be formed of senior faculty from a wide variety of academic disciplines and at least one relatively senior member from administration. It is desirable to have a large steering committee to generate many ideas and create broad support for the conference. The steering committee's work can be done in relatively few meetings that conclude a year before the proposed conference. We found a series of four monthly meetings were sufficient. They should:

- Verify/modify the proposed conference goals. (How important/likely is equal student representation among departments? What is the targeted number of students?)
- Select an optimal length of event. (Half-day? Full-day? Two-day?)
- Determine a venue from a list of suggestions. (What kind of room/presentation style is best suited to each department's work—Power-point equipped A/V rooms for talks, poster sessions with tables for apparatus demonstration, stage for performances, other?)
- Select an optimal time of year. (First semester so students can list achievements on job/internship applications? End of second semester for year-long projects? Location relative to final exams/holidays/special events?)
- Select an optimal day of the week, and combine with previous findings to select a conference date. (During the weekend to prevent class conflicts? During the week to encourage attendance by non-presenters? Friday? Midweek?)
- Determine ways to motivate students to participate, and ways to encourage faculty to urge their students to participate. Should classes be cancelled for a half-day to increase visitation?
- Decide what kind of research can be represented. (Independent research for credit only? Or also internships, products of classroom work, non-credit work, other? Where should the balance be between permitting only an elite few of excellent papers to be presented vs. permitting large numbers of mediocre presentations?)
- Identify other groups who should be notified (e.g. Public Affairs, Foundation for possible fund-raising, Campus Police to deconflict proposed date).
- Identify resources that can assist with implementation (e.g. student honor societies, protocol office, A/V support section, IT for abstract submission website development.)
- Decide on the application procedure (e.g. the abstract due date, who reviews it for acceptance, deadline for rewritten abstracts, whether a paper for a proceeding is required.)
- Agree on judging procedure (e.g. at least three judges per presentation selected from faculty and guests with experience in that field.)
- Identify VIPs that may want to be involved, either in the awards banquet or in judging (e.g. dean, school president, president of the board of trustees, major academic donors.)
- Should there be other attractions at the conference besides student presentations? (e.g. faculty workshops, academic publishers, faculty research presentations designed to attract students.)
- Brainstorm possible keynote speakers.

*Operations Committee Advance Planning*

The operations committee implements the ideas formed by the steering committee, and begins advance planning work about a year before the conference date. It can be much smaller than the steering committee; we have found 2 to 5 people plus the director works well. Use the operations committee to do the pre-conference organizing directly, but create separate subcommittees or identify existing institutional infrastructure (e.g. catering) to perform all the tasks required during the conference to free the operations committee for oversight/supervision during the event.

It is useful to divide the operations committee into clearly-identified teams, for example a people-oriented public-relations team with literary and artistic skills, and a details-oriented logistics team that is familiar with the university infrastructure for reservations and for handling the myriad of details required for a successful conference. Include at least one student (e.g. an honorary society president) on the committee, and make wise use of student organizations to provide labor and to disseminate information. In the time following key decisions from the steering committee but prior to about six months before the conference, the operations committee should:

- Reserve the conference hall.
- Decide the chronology of the entire event (e.g. kickoff luncheon with keynote speaker, afternoon conference in Moody Hall, awards banquet dinner).
- Decide physical layout of the hall and the chronology of the presentations (e.g. 4 sessions of 3 presentations rooms downstairs and a single poster session upstairs running for the duration).
- Design conference logo and use on stationary, brochures, mailings, etc.
- Order miscellaneous conference supplies.
- Deconflict with administration's various calendars and have date printed on the official school calendar (typically need this by May of the previous year).
- Identify judges (may want to work with the foundation office).
- Invite VIPs.
- Create a website with basic conference information (day/place), motivation to apply, instructions to submit an abstract, and sample abstracts.
- Develop ideas to encourage student and faculty awareness and participation (e.g. university newsletter article, email notification from the dean, letters to departments, visitations to each department, academic board notification, parents newsletter, posters for department bulletin boards).
- Design a booklet that describes the benefits of conference participation, the deadline for abstract submission, examples of abstracts written in the sciences, humanities, and engineering.
- Arrange keynote speakers.

### Abstract Submission

The next major phase of the conference deals with building enthusiasm, collecting abstract submissions, reviewing them, and publishing a symposium guide. Either generate a web-submission form or a Word template form for email submissions; hardcopies or Acrobat files will require retyping for the symposium guide.

A difficult task in the first conference will be to encourage students to participate since they have no one to guide them who has been through the process in a previous year. To encourage maximum participation, consider publicizing an initial abstract submission deadline several months in advance of the conference, and then (for the initial conference only) offer an extended deadline of another few weeks. We were able to increase our student participation from 6% of the upper two classes in an initial deadline three months before the conference to 10% after an extended deadline six weeks before the conference by doing this, with submission dates interspersed with a publicity campaign of mailers, emails, and posters. A second call for abstracts also allows targeted recruitment of specific departments that were initially underrepresented.

There will be some confusion among both students and faculty before the first conference regarding the application procedure, deadlines, and quality expectations. To decrease misunderstandings, after the initial announcement of the conference and call for abstracts, consider publishing a series of emails in the months before the abstract submission deadline to generate excitement, explain how to apply, and give examples of good and bad abstracts submissions. Consider also publishing a brochure with similar information and distribute them to all students, faculty, and administration, and possibly schedule individual department informational visits; the information-saturated environment of college campuses almost requires publishing in multiple formats to get full student consideration.

To ensure abstracts are well-written, require a cover letter or email signed by the student's advisor saying that the advisor has reviewed the abstract and feels it is worthy of publication. Although they should be also be reviewed for grammar by the operations committee; it is our experience that abstracts with an advisor's statement are only rarely in need of substantial revision.

Once the final deadline for abstract submission is closed, combine similar topics into presentation sessions and slot into rooms and times. We have found that even after the final deadline there were a few student/faculty teams that wanted the chance to present late-breaking research results. To accommodate these latecomers consider keeping one session free for late submissions, with the understanding that they will not be advertised in the symposium guide or be guaranteed a judging opportunity.

If a poster session is chosen for the sciences or engineering, posterboards should be acquired during this time. They may be constructed from blue polystyrene building insulation boards and propped against a wall ($5 each and look it), built by the university buildings and grounds division (these look excellent if made by spray adhesive binding fabric over cork over plywood, but cost about $30 each in materials), or purchased from a trade-show supplier (very professional look for about $75 each).

The Symposium Guide should be published immediately after the final close of abstracts. Order one copy for each presenter, faculty advisor, judge, department head, VIP, and extras as requested by the foundation, alumni affairs, and for public relations. Place an acrobat copy on the web and create a single-sheet summary of presentation name, presenter, and location that may be printed in mass for visitors.

In addition to a Symposium Guide, we have also found that a Symposium Overview Brochure is helpful. The Overview Brochure should only contain the presenter's names, presentation titles, and timetable. Generally, you should be able to fit all this information in an attractive color tri-fold pamphlet. Order the same number of Overview Brochures as Symposium Guides. We found that most people use this abbreviated document to plan which presentations they will attend throughout the day. Additionally, they are easily sent to all faculty, staff, and VIP's as reminders before the symposium, and are heavily used by administration for promotional purposes after the symposium.

## Preproduction

It is during the preproduction phase of symposium planning that the load on the Operations Committee begins to ramp up significantly. Over the next couple of weeks several critical events must take place that can dramatically affect the success of the symposium. It is during the preproduction phase that the Operations Committee must address the many unexpected issues that will inevitably arise. These range from last minute institutional scheduling conflicts which can drastically reduce symposium attendance to presentation cancellations and judging changes. It is important that all members of the Committee be involved in the preproduction process. Even the best planned symposia will require some late nights at this point.

*Presentation Submittals*

The next major deadline will be the submission of the actual presentations. This should occur about one week before the conference. Make sure that several e-mail announcements are sent well ahead of the submittal deadline to both the student presenters and their advisors. It is critical that the advisors are well aware of the presentation deadline since they often are the primary timeline enforcers and presentation reviewers. It is a good idea to require that each presentation be submitted electronically in PowerPoint format. Even if the presentation will not be done electronically, a PowerPoint title slide should be submitted so that the conference organizers and the audio-visual support personnel have a record that, in fact, a presentation for that time slot has been committed.

The method for presentation submission can become problematic if proper preparations have not been made well in advance. It is not recommended that the presentations be e-mailed to conference organizers or A/V support. The easiest submission methods to create and maintain are either an internal network folder available through the symposium web site or an ftp site. Since each presentation can run upward of 100 to 500 MB (depending on graphics, animations, etc.), enough drive space needs to be available to contain all the presentations expected. If for some reason it is not possible for a presentation to be submitted electronically, have the student burn it onto a CDROM and hand delivered. Whatever method is chosen, make sure to get this up and running weeks before the submission deadline. It can be difficult for IT departments to get network drive space allocated on short notice.

As the submission deadline draws near you will likely become a pseudo-advisor to many students who, for whatever reason, are unable to submit their presentations. The most common problems are associated with the electronic submittal. Often neither the students nor the advisors are familiar with the required software or submission techniques. A thick skin and patience will be required as you walk the students and/or advisors through the process. Do not expect 100 percent compliance. It will not happen.

The other problem that arises at this point in conference planning is the beginning of "submission regret syndrome." What sounded like a great idea to students a month or two ago is now turning out to be a lot more work than they planned. There will most likely be several requests to back out – the majority on the final submissions due date. At this point, the Symposium Guide and Overview Brochure have already been sent for printing, so any cancellation will leave a dead period in one of the time slots. Since part of the goal of the symposium is to educate students (and often advisors) on the process of reporting and presenting scholarly work, presentation cancellations should not be made painless. Both the students and advisors should be aware that their names will be listed in the conference program, and that a failure to present will reflect badly on everyone. Obviously, there may be some emergencies that arise which simply make it impossible for a student to present. This can be explained at the symposium during the affected time slot. However, lack of preparation should not be treated as an excusable emergency.

It is not necessary for the poster presenters to submit electronic copies before the dry run (discussed below). However, a sample poster board should be set up at an announced location several weeks before the symposium to allow students to try various poster arrangements and to check the size of the poster boards.

*Audio-Visual Support*

At this point some comments should be made concerning A/V support. Most universities have students who work in some capacity for the school IT department. This is a good place to find help with obtaining the necessary A/V equipment and personnel and coordinating the presentations on the computers. We have found that it is important to use students who have been demonstrably competent and responsible. This may mean paying for their services. While this may seem like a unnecessary expense, having excellent A/V support can reduce the number of problems that develop during the events leading up to the symposium. Additionally, it can reduce the anxiety and down time, not to mention embarrassment, when a piece of A/V equipment unexpectedly fails. You will need at least as many A/V support personnel as you have rooms. On the day of the symposium, it is preferable to have one additional A/V support student available in case equipment changes or networking solutions need to be handled at a location away from the venues.

*Presentation Dry Runs*

Perhaps the most critical time in the preproduction process is the day where each cadet is required to show up at his/her presentation room and verify that their presentation operates flawlessly on the A/V equipment. We have found that having a four hour window the evening before the symposium provides adequate time to address any issues that arise. Going through the dry runs at an earlier time is not particularly advantageous since you want to be operating with the same equipment that will be available during the actual symposium. Additionally, the rooms should be set up in the exact manner that the students will see them on the day of their presentation. Because it is during the dry runs that many A/V problems arise for the first time, the dry run process should be a mandatory event for every student participating in the symposium. This includes any student A/V support personnel and ushers/guides.

Keep in mind that the following items will have to be available as the students show up during the dry run window:

<u>*Poster Presentations*</u>

- Poster boards
- Tables with skirting
- Extension cords

- Lots of tacks or push pins
- Duct tape

*Oral Presentations*

- Podiums
- A/V equipment (internet connections if required)
- Projection screens
- Laser pointers

If the posters are scheduled so that they will be switched out during the symposium, flat thumbtacks are recommended. This allows the poster boards to be folded up and stored in a compact form until they are needed.

Each room where presentations are taking place should be staffed with an Operations Committee member who is responsible for checking off students as they arrive. They should also be responsible for coordinating the A/V support in their room. The same is true for the poster presentation venues. The room coordinators should all have cell phones or walkie-talkies to allow communication between venues. During the four hour dry run period, we highly recommend having a paid student volunteer available serve as a messenger between venues.

*Signs and Posters*

You will need to make several types of signs and posters:

*Symposium announcement posters*

These should be very large and located strategically throughout the college/university. The symposium announcement posters are aimed at guiding people to the various symposium venues and reminding faculty, staff, and students that the symposium is happening.

*Venue posters*

The venue posters should be prominently located inside the entrance of the venues. They serve to guide attendees to the various presentation rooms within the building. It is helpful to include the session names and the presentation titles within each session on the venue posters.

*Room signs*

The room signs should be located outside each presentation room. They should contain the current session presenters and presentation timetable.

Several sets of venue posters and room signs will be required if a room and/or venue is used for several sessions. You will need many easels to display the posters and signs.

Conference Event

We have found that if the symposium has been adequately planned, the day of the conference is relatively calm for the conference organizers. However, there are a few items which need to be addressed.

*Registration Tables*
Registration tables should be set up inside the doors of each venue. These tables should be stocked with additional copies of the Symposium Guide and Overview Brochure. This can happen either the morning of the conference or during the dry run period the evening before. These registration tables should be manned throughout the conference. The students manning the tables are responsible for:

- Handing out conference material
- Providing nametags for VIP's
- Changing venue posters and room signs between sessions
- Refilling water pitchers in the presentation rooms
- Keeping the venues clean of all trash
- Answering any questions from conference attendees
- Handing out and collecting the judging forms

*Judges and Session Chairs*
Faculty judges and session chairs for each session should have been arranged well ahead of time. Make sure that a reminder is sent to each participating faculty the day before the conference telling them where they need to be and when. You can send them electronic versions of the judging forms at that time. Have additional forms available at the registration tables. Make sure that the judges and session chairs know where to turn in the judging forms and give them a deadline on when they are due. Because the students will be very eager to know the outcome of the judging, you will need to tally the results immediately after the conference closes in order to compile the results in time for the conference dinner.

The most controversial aspect of our undergraduate research conferences has been the judging outcomes. The primary reason for this is that much of the judging is being done by faculty who are not experts in many of the areas that are being presented. Therefore, presentation style becomes a large factor in scoring the posters and presentations. To alleviate some of the controversy, it is recommended that the Operations Committee have faculty from each discipline review and accept the judging form to be used in their oral and poster presentations. Additionally, all faculty should be given the opportunity to judge the presentations/posters. Having the faculty of each discipline own part of the judging process should help quiet much of the criticisms and also shift part of the responsibility away from the conference organizers.

*Conference Dinner*
The purpose of the conference dinner is to provide a forum where all the students and advisors are congratulated on their efforts. The dinner can also serve as an event to announce the following year's conference organizer. Since planning for the next conference will start almost immediately, the organizer should have already been selected. Finally, the dinner provides a great forum to announce the results of the judging. During the day of the conference, one of the Operations Committee members should check to make sure the dining facility is being set up correctly, including the A/V equipment.

Our conference dinners include a guest speaker chosen to appeal to a wide audience. Highly technical presentations should be avoided. The goal of the presentation should be to show the students and advisors that their work in undergraduate research is important and valuable; a "job well done" from a prominent guest.

## After Action

Besides thank-you notes to all who played an active role in the conference, there are a couple important items that should be addressed after the conference has concluded. While the tendency for the organizers will be to cease all work associated with the conference, addressing these issues will make the work of the next year's organizers much easier. Additionally, it is during this phase of conference planning that much positive publicity can be generated.

### *Post-Publicity*

Throughout the conference, you should have a photographer take pictures of the poster and oral presentations at the various venues. These can be used in the brochures and announcements for the next conference. Additionally, they can be used in any articles written for internal and external institute papers. A summary of conference participation and judging results should also be circulated via e-mail.

The abstracts and/or papers generated at the conference are ideal for inclusion in an undergraduate research journal. Students should be given the option to expand their presentation into a paper suitable for publication. This leverages the student's presentation into a conference proceeding.

### *After-Action Report*

Another significant document that needs to be generated after the conference has ended is an after-action report. This document should contain hard numbers on conference participation and attendance. These numbers should be broken down by discipline, major, student type (freshman, sophomore, junior, senior), etc. This will provide the basis for evaluating and assessing trends in conference growth. Additionally, the after-action report should detail all the problems that were encountered during the planning and execution of the conference. This document is an invaluable tool for future improvements.

## Conclusions

An undergraduate research conference is an ideal forum to showcase the achievements of students involved with student/faculty research projects. In addition to celebrating the past work of students, it also serves to excite and motivate additional students and faculty to get involved in the undergraduate research experience. However, the planning and execution of an undergraduate research conference can be quite challenging because it requires networking with a large number of university resources. Hopefully this paper has provided a framework from which first-time conference organizers can build a successful conference while avoiding some of the pitfalls that develop during the process.

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