The moral of all this is that if you cite generously (and avoid cutting remarks in so doing), you can expect your colleagues and even your competitors (within reason) to do the same with your work, and to be your “friends.” On the other hand, if you are stingy in your reference list you are definitely heading for trouble and incurring unnecessary resentment.

4.3 Conferences: What they can do for you

In general, the best way to present your results is to publish them in written form, since “Verba volant, scripta manent.” (“Speech is fleeting, the written word endures.”) As we keep reminding you, writing compelling papers for peer-reviewed journals is undoubtedly one of the very best ways (perhaps the very best) to advance your career and make a mark in your field of research. Given this, why should you go to a conference and present your results more directly, it is true, but in a way that is much more ephemeral?

(While most conferences are published in some form, those results are often extremely difficult to find in a few years, unless the results appear in a peer-reviewed journal. The modern tendency to distribute CD’s is worse because they are likely to be much harder to find than a book (which might be in some library) for someone who didn’t actually attend the conference and receive the CD as a result.)

The advantage is that you gain a brief opportunity to make a strong impression on those in the audience (or those who go to your poster). The analogy here might be to an author on a book promotion tour. (The author is promoting the book; you are promoting your work.)

There are four main reasons to attend a conference beside the simple act of presentation itself. These reasons can be caricatured as (1) Advertisement and Feedback, (2) Gathering Intelligence, (3) General Networking and (4) Exploring Opportunities Elsewhere. Let us take them in turn.

4.3.1 Conference reason #1

Advertisement and Feedback. You want to present your results to an audience that you hope may be interested in what you have to say (and perhaps in following up the details in print), and you hope to get some feedback from them.

As well as these laudable aims, you also want to remind your fellow scientists of the written work you have published, draw their attention to your latest results (as yet unpublished) and to the future perspectives of what you are doing. Basically, the underlying aim of your presentation is to convince your colleagues that what you are doing is interesting and promising, and that they should definitely find the time to read your recent papers in the literature, and look out for your future ones (or ask for preprints). If you are convincing enough, some of them may even propose to collaborate with you (however no more than half of them will prove to be serious about it). Do not forget to bring along several reprints of your recent papers as well as a stack of business cards, to keep in touch with your new acquaintances. (Bring business cards even if you are still a student — they will also make you look a lot more professional to your senior colleagues.) It is true that with e-mail available, many now prefer to be sent the material electronically, but others may want to read such material on the way home (or even at the conference, if particularly interested). This, then, is the usual primary and explicit reason for attending a conference.

4.3.2 Conference reason #2

Gathering intelligence. At a conference you will usually hear the latest and most exciting news in your field of research. (It actually depends considerably on the conference; unfortunately some meetings afford quite poor pickings.)

In terms of intelligence gathering, remember that the papers published on journals online or in print this week contain information that was reported at conferences between three and six months ago. Conversely, the results presented at a conference this week contain results that will be published within the next three to six months. If you
want to keep abreast of the events in your field, you should plan to attend at least one conference per year, possibly two (also depending on how fast your field is moving, and how fast you move relative to it).

### 4.3.3 Conference reason #3

**General Networking.** Conferences are great venues for networking, the discussion and negotiation activity necessary to put in place the informal arrangements that enable much research. Meeting other scientists in a relaxed atmosphere and discussing many topics informally is a great way to make friends and to sound people out. Since the research core in most fields of research tends to be relatively small, making friends is vital. Ultimately your success will depend greatly on how many friends you have, and who they are.

By the way, for the young scientist, here is a necessary word of caution. Many scientists (and especially famous ones, or the others who think they are or should be famous) tend to have a BIG ego. This often means that they are easy to offend, even if that is furthest from your mind. (An interesting definition of good manners: “A person who has good manners never gives offense unintentionally.”) Since it is risky to offend such people (for example if you are invading their territory), if you know that Dr. Famous may be in the audience, listening to your talk, you should certainly consider citing Dr. Famous during your presentation, perhaps referring to Dr. Famous’ seminal work in this field, which has “... inspired you and many other colleagues to do etc. etc.” (Of course, you should really do this only if the work is actually relevant in the context of what you are presenting, otherwise you will sound a bit ridiculous if not downright silly.) It is better if you actually have that written down somewhere conveniently on one of your images, so that you do not forget to say it, and so that it is visible besides being audible. Even if Dr. Famous has already left (perhaps his talk was scheduled before yours, or perhaps he did not show up at all, which is another prerogative of famous, arrogant scientists), his students or post-docs or friends may be in the audience. So you should still watch what you say, and also what you don’t say! You may find that this type of overdiplomatic conduct is distasteful. In some ways, we agree with you. However you have to live in the real world of scientific research, and this simple advice may turn out to be useful. (Perhaps, if YOU happen to have a big ego, or develop one, there will come a time when YOU will get upset if others do not appreciate and appraise your work!)

There is one more aspect that we have hinted at but which we bring to your attention in connection with highly developed egos, and that aspect is territoriality which is usually expressed in turf wars. Because of his paper(s) on a given topic in the past, Dr. Famous may come to be convinced that this is his “turf,” so that you should not blunder into it without his blessing. If you find this out early enough, Dr. Famous can usually be disarmed by asking about this work, whether it was followed up or not. If you do not cite him at all you may expect trouble. (A mentor may be able to provide valuable guidance here.) This applies even more if Dr. Famous is in your own department, since there is often an unwritten law (to avoid turf wars on one’s doorstep) that researchers do not trespass on the research areas of other members of the same department except when involved in a specific collaboration project between them. Think carefully before you enter the forbidden garden, and estimate the cost beforehand!

### 4.3.4 Conference reason #4

**Exploring Opportunities Elsewhere.** Another excellent reason to attend a conference is for checking out job opportunities, or even posting your own job advertisement (although arguably this is again part of the networking motivation) or looking for an extended visit or even a sabbatical somewhere else. In general, the “big” conferences (in the materials sciences they would be the APS, MRS, AVS, ACS meetings in the U.S., EPS, ECOSS etc. in Europe, and so on) will offer an employment center, with companies, universities and government labs posting their ads and sometimes even carrying out on site interviews. In smaller conferences you must shift for yourself.
4.3.5 Go if several reasons apply

Generally speaking, the best conference situation is when several of these reasons apply. For example, if you cannot present anything “hot” (e.g., you have just started a new project and do not have enough new results yet), or if the conference is in a field which overlaps only partially with yours, or if the people you want to network with are unlikely to be present at the meeting, perhaps you are better off saving your time and money for the next available conference that meets these requirements. There are, after all, a great number of scientific meetings every year, so it will be relatively easy to find a new one which is a better match to your requirements.

4.3.6 Invited talks at conferences

An important exception to this rule of thumb (i.e., of going only when more than one condition is satisfied), is when you have an invited talk. In that case you should most probably go, even if the other reasons are not met. It is relatively rare to receive an invitation to give an invited lecture at a conference, and if you get it, you should take advantage of it. Especially at an early stage of your career, an invited talk at an international conference really stands out on your CV. It shows that your peers think particularly highly of you, and that your work is having an impact in your field. It is the sort of recognition that boosts your confidence and visibility, and is therefore very important. Perhaps one day when you are famous you will turn down some invitations to talk at conferences, or generously pass them to your post-docs and younger collaborators. Until then, you should accept them all, even if the organizers do not offer to contribute to your travel expenses. You should consider such expenses as a wise investment on your CV, and therefore on your future.

4.3.7 Conference trip funding

Going to a conference has to be feasible within some travel budget and must be a justifiable expense in terms of that source of funding. If your travel is controlled by your supervisor then the rationale for going to the conference must be thus justified and negotiated between the two of you.

Before asking your supervisor to send you to a given meeting, it would be wise to come up with a realistic budget. (Your supervisor will probably ask you to do that anyway, so it will look better if you do it without being asked.) For example, you can check out the best airfares on the internet; however, your most important task is to check whether the conference offers a discounted registration rate for students (sometimes even student grants), and other similar discounts, like cheap student accommodation. (You may benefit from knowing that many conferences actually hold prize competitions for the best student oral and/or poster presentations.) Once you have come up with a total budget, it will be much easier to determine whether there is enough money for you to attend the conference. If other group members are looking into attending the same conference, you may look into a collective budget.

Traveling to conferences and meetings (which are occasionally held in beautiful locations) is perhaps one of the most interesting and appealing fringe benefits of our job. The temptation to do it often is therefore quite strong. Unless you are famous and are invited everywhere (and have unlimited funds to spend on travel), however, you should not exaggerate. In fact, after a few meetings, you are likely to start hearing the same talks and results over and over again, in which case you are better off staying in your lab or at your computer and actually trying to do something new.

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1 Until about two decades ago, in most cases an invitation to give a lecture at a conference would be accompanied by an offer to reimburse all, or at least most, of the invitee’s expenses. Sadly, this is rarely the case now. Funds to organize conferences are becoming more and more scarce, partly because too many competing conferences are being organized. Also, meetings organized by large organizations tend to be more expensive and even more stingy, because a significant part of the revenues from the conference will be used to pay the salary and benefits of the organization’s employees.
4.3.8 Conference papers (proceedings)

Presentations at conferences often have a hard-copy after-effect. If the upshot is a refereed paper in a respected journal (typically this is only for Invited Presentations) then you may treat this as a reasonable publication like any other. (As an example, Invited Papers at the annual meeting of the Division of Plasma Physics are usually published (after refereeing) in a special number of Physics of Plasmas. In terms of other papers in Physics of Plasmas these are more highly rated because the selection process is fairly rigorous — albeit somewhat political.)

Some conferences (often in Europe, or involving a considerable third-world representation) attempt to pressure authors of submitted contributions into submitting a (four-page) paper based on their refereed abstract, which then comes out (nowadays) on a Compact Disc, which only the conference attendees can obtain. In days gone by, a conference volume or two was produced instead of the CD. Years after it may be quite difficult to find a copy of the volume in question. (One reason for this state of quasi-publication is that conferences attended by scientists from the developing world often find that these people can only attend if the conference is “refereed” and a polite fiction is maintained that a paper might be rejected, even if they never are in practice.) Clearly this limited distribution is hardly a publication in the strictest sense of unlimited life in accessible form. For this reason many people tend to ignore the strictures on redundant publication and publish essentially the same material (often mixed with other stuff) in a proper refereed journal where future access is more or less guaranteed. This of course is in conflict with most journals strictures on prior publication of the work being submitted, and further devalues the conference quasi-publication. However this adulteration is still a fact of life.

Unless you are at a very early stage in your career and desperately need to publish extra papers, it is best not to provide contributions for conference proceedings. These contributions are rarely seriously peer-reviewed, and this is reflected in the quality of the published papers.\(^6\)

\(^6\) One notable exception that comes to mind are the proceedings from the IEEE series. Those tend to be peer-reviewed quite rigorously, thus keeping a high standard.

which are often not nearly as good as the peer-reviewed papers that appear in regular scientific journals. In any case, few scientists today have the time to read conference proceedings. Papers that appear in proceedings volumes are rarely cited, since they are not read in the first place. Your peers’ opinion of you will depend on how much and what you publish, and how often your work is cited. In the short run, when you are a student and your publication list is short, your CV may benefit from that extra paper, even in a proceedings publication. If this is the situation, you should discuss this option with your advisor, on a case-by-case basis. In the long run however, publishing an extra paper, that is probably a re-cooked version of something you already published, and that will not be read and cited, is not a good strategy, since it diminishes your overall impact. To make your mark as a scientist, your best strategy is to do good work and publish in terms of quality, not of quantity. As an indirect benefit to the environment, avoiding the publication of inferior papers will actually save some trees.

Indeed if the results you present at the conference are good and original, you should write them up and submit them as a regular article in a peer reviewed journal. If they are not that good, perhaps because they are preliminary and/or incomplete, you should wait until you have a coherent story to tell. While preliminary results are generally accepted at meetings in oral or poster form, they are not well received in print (what you publish in written form is meant to last, to “stand the test of time”). Also, double or triple publications with very similar titles and contents are not well viewed by other scientists. The scientific literature is already clogged with papers, many of them being fairly useless. Thus contributing “cloned” papers will not win you any credit or “brownie points” with your peers or your administration. Remember, in this job your peers’ opinion of you is critically important for your well being. Perhaps the best compromise is to cite the work presented at a conference as an un-refereed talk/poster. Not furnishing the four-page paper for the CD makes this a reality.

There is one last aspect about conference proceedings. They usually come with a deadline to submit your manuscript, more often than not during the conference itself. This can be good or bad, depending on your personality. Some people work effectively only if they are under
pressure, for example to meet a certain deadline, and probably for them it is good. (If you want to know more about the advice on this specific topic, read the section on Meeting deadlines.) Other people do not like to be pressured. Rather, they like to take their time (sometimes in a glacial scale) and think their material through thoroughly and carefully. I would say that in the long run this latter category tends to produce the best science (with some exceptions, of course). On the down side, these practitioners of the “few but ripe” school of publication also run the risk of being scooped, which is not a pleasant experience. You should find out early on which category you belong to, and govern yourself accordingly.

4.3.9 Posters or oral presentations?

When discussing posters (which are also discussed in Sec. 5.6), we were not able to come to a “we” consensus between us, so we decided to present each point of view separately. The difference is probably due to the difference in the way the important meetings in our respective fields are organized. We each naturally tend to support what works for us in our discipline.

Federico: — With very few exceptions, I personally think that posters should only be used for a small meeting. When going to a major conference, one of your main goals in presenting your results is to increase your signal-to-noise ratio. (Your signal is represented by your own work, and the noise level is what everybody else is talking about.)

This means essentially that you want your work to stand out.

At a large meeting with a great number of attendees, the only way to be visible is to have at least an Oral Presentation (This can be called parallel visibility, since you reach out to everybody at once.) If you have only a poster (this is serial visibility), there is the chance that nobody will show up to look at it, or perhaps only your friends will come over. This is frustrating on one hand, and on the other hand it means that you are wasting your time and money.

At a small meeting, conversely, it may be good to present a poster. Small meetings tend to be more relaxed and informal, and you are not competing with hundreds of other people to present your work. It is not uncommon to have lively scientific discussions in front of a poster, and this is particularly true at small workshops and conferences.

Tudor: — If your presentation is an Invited Presentation it will always be an oral presentation, so the question of a choice does not then arise. (However sometimes the speaker will be requested to post the images used in the talk (without staying by the poster) for subsequent study by those who could not be at the oral presentation. This is also handy for people to leave requests for copies on the poster sign-up request sheet.)

For contributed papers, on the other hand, the choice between these two ephemeral modes of presentation should be determined by the nature and practice of the presentations at the conference, and in particular by whether the conference is dominated by many sessions in parallel (a likely event if the conference is very large) and whether the time limit for contributed talks is short (15 minutes is common).

If the meeting is small, say less than 200 attendees, with no parallel sessions, the choice can be a matter of simple preference. Most would opt for an oral presentation which will be heard by most attendees. In such meetings, however, there is usually a limit on the number of oral presentations (including “one to a customer”) so you may be forced to do one or more posters in any case. (A small meeting with an evening poster session with beer and wine can be most enjoyable!)

If the conference is large it is likely to be dominated by many sessions in parallel, with a severe time limit for contributed talks (15 minutes is common). The decisive point is then whether your type of subject will be accorded a session of its own.

If your topic has a session of its own, it is in effect a small mini-conference, the people who are interested in subjects related to yours will probably be in attendance at that session, and so an oral presentation is a natural and excellent choice. (You are only tied to your talk for a limited time, and your responses to any questions are available to all in the room.)

If, however, the sessions are fairly heterogeneous, or if your subject does not (yet) fall into a major theme, and you present in a very mixed session, your best friends and important colleagues may well miss your isolated talk, especially if a speaker does not turn up and the chairman just keeps going, so that your talk is ahead of time and likely to be missed by your friends and allies.
In the case that you are likely to be in a heterogeneous oral session, it is best to opt for a poster in a poster session with like-minded neighbors. It may also be true that people in your topic have become poster people at that meeting, in which case you do likewise and join the crowd. When you give a poster it is true that you are tied to the poster for a time much longer than the 15 minutes or so for a talk (it helps of course if you can time-share with co-authors), but detailed exploration is easy for the visiting experts in a way that is impossible for an oral presentation, and of course you will have a sign-up sheet for requests. (Responding to these is now very easy by e-mail.)

4.4 Seminars: What they can do for you

Arising out of conferences, or in parallel with travel to a conference, or through personal contacts, you may arrange or be asked to give a seminar on your work at an institute or university department or the like. By seminar is meant simply a talk before a group of modest size (at a university department or a research institute) at a reasonable length (somewhat under an hour is usual). Thus you can explain your work at ease without being allowed for all but the most vaunted of invited talks at a conference.

Apart from the pleasure and luxury of explaining your work to people who want to hear about it, not to mention the fact that it looks good on the CV, seminars can do a lot for you, if handled well. The most important seminars are those given in connection with an application for employment, and are included therefore as part of the job interview. The more informal seminars (usually via an invitation from a colleague) are an excellent way to deepen useful contacts, perhaps a first step to arranging for a collaboration, or possibly for a sabbatical visit later on. Another important aspect of a seminar is to help in finding and evaluating students or post-doctoral fellows.

Although a seminar is a form of oral presentation, just like the ones you give at conferences, it should be a quite different performance. Intrinsically different from conference presentations; seminars often tend to be a lot more informal, and the audience is frequently much smaller. (But again, that may depend on the size of the conference, and on the size of the department where you are invited to give a seminar.) At the same time, the duration of a seminar is typically 40-45 minutes, and during this time you are expected to give a more general introduction and more comprehensive description of your field of research. This is your chance to tell a complete story, and you should take full advantage of it.

A more sophisticated form of seminar is called "colloquium." Typically a "normal" seminar is given to a restricted audience within a given department (e.g., the astrophysics community in a physics department, or the organic chemistry community in a chemistry department). A colloquium on the other hand is meant to be more general, with a very broad scope, and is thus intended for the whole department and sometimes even for people in other departments. (Nobel Laureates typically tend to attract a crowd.)

4.5 Employment interviews

To respond to a job announcement, you must usually tailor your CV with respect to the specific advertisement to which you are responding. Typical ads specify the set of skills and experience they are looking for, and you should make sure that you are emphasizing these aspects appropriately in your CV and possibly also in a cover letter, in which you describe concisely who you are and why you are the best candidate for the job.

If you are applying for a post-doctoral position, this material (plus reference letters which are usually sent separately) is normally enough. If, on the other hand, you are applying for a faculty position, you are expected to submit also a statement of teaching philosophy and a description of research interests (often also with a fairly detailed request of start-up funds). A job ad for a position in industry or in a government lab is likely to demand other sets of skills.

The burden is always on you to demonstrate, first on paper and then in person at the interview, that you are the best person for that job. In this sense, the importance of writing a good cover letter to outline your overall skills, competence and fit with the job profile cannot be overemphasized. This document is the "set-up" for the interview, and you will have succeeded if much of the interview time is spent asking you to expand on what you raised in your application.