

## **SOME THOUGHTS ON SUCCESSFUL LABORATORY APPRENTICES**

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Over the last three years I have participated as a mentor for the Apprenticeships in Science and Engineering Program. During that time I have witnessed the difficulties of some of the apprentices as they have come to grips with the activity of doing science, as opposed to the activity of studying science. The following is the advice that I would give to any student who is seriously considering applying to this program. The advice is offered in the spirit of trying to help the apprentice succeed as rapidly as possible in a new, exciting, but sometimes confusing environment where relationships and responsibilities are not always explicitly defined.

**1) Devote a full-time effort to the apprenticeship.** Many high school students who are given the opportunity of working as an apprentice come from families that have taken an active interest in education. This usually means that they have tried to structure activities for their children that will be enriching and educational. These activities often include: music lessons, part time volunteer work, summer travels, dance classes, tennis lessons, etc. If you hope to succeed as an apprentice you must spend an inordinate amount of time both in the lab and away from the lab trying to come to grips with the scientific problems to which you are assigned. The apprenticeship should not be regarded as one additional activity in which a well-rounded student participates.

**2) Regard your apprenticeship as a real job in which you are trying to succeed rather than as an extension of your high school education.** You must convince your mentor that you are serious about your work. This requires a different level of effort from you than that required to convince a science teacher that you can do well in a science course in school. You should try to master as much information as you can that is relevant to your particular problem. This means taking home articles to read and returning the next day with specific questions about these articles. Your questions should reflect a genuine attempt to understand complex material. Don't assume that because there are no explicit assignments or tests that you have nothing to read. Your job is to become as expert as you can in the focal area of interest of the laboratory in which you are serving as an apprentice.

Come to the lab early. Stay late. Don't leave jobs partially completed. Try to develop technical skills that make you useful to others working in the laboratory. In other words, trade your time and energy (attributes which you possess) for knowledge and additional technical skills (attributes that you might lack).

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**3) Understand that the focus of a scientific laboratory is the successful production of new knowledge.** Science is an extremely competitive activity. The amount of time that a mentor has to train an apprentice for an eight-week period will be limited. However, most mentors will be more than willing to devote extra time to an apprentice who is obviously making an extra commitment of his or her own time.

**4) Don't be offended if you are asked to do "grunt work."** If you have skills that are useful to the overall functioning of the laboratory (computer programming, photography, artistic skills, carpentry, machining, etc.) use these skills to help others in the lab with the aim of inducing them to teach you skills that you lack.

**5) Be prepared.** Serendipitous accidents occur in the laboratory, but it takes a prepared mind to recognize accidents and to sort out the good from the bad and the ugly.

**6) Structure your time wisely.** Go to the lab with a purpose. If you cannot achieve your "first" purpose on a given day, think of a second purpose. This is your responsibility and it can be shared only in part by your mentor.