

Manny's unauthorized tips for setting up an independent research experience.

Doing independent research as an undergraduate can dramatically alter the educational experience. Most MCD professors began their research careers as undergraduates. Some of us can even remember what it was like, and how it changed the way we learned things.

How can you tell whether you should pursue the opportunity of doing independent research? Below are two lists. If you read the first list and find yourself there, then research may be right for you. If you find yourself more on the second list, then...

(Confidential to the pre-med student: If you are NOT questioning your goal to become the very best doctor ever, then spend your volunteer time doing an internship associated with health care delivery instead of undergraduate research. Although the rare MD can occasionally make important research contributions, medical school teaches you to *practice medicine*, a demanding technical skill that is not the same as biomedical research.)

List 1. Good reasons to do a research-based independent study

You are really, really interested in the topic being researched.

Learning something is best accomplished by doing it.

You want to go to graduate school and would like to demonstrate your abilities in research.

If you find you like research, you may want to consider it as a career.

List 2. Not good reasons to do a research-based independent study

You need 5 units and nothing fits in your schedule.

You need to satisfy an upper division lab requirement.

You want to “get to know” a professor so you can get a recommendation letter.

Somebody told you that you should do an independent study but you aren't clear why.

OK so if you are more lined up with list 1, what do you do next?

Think! Talk to yourself! What am I really interested in? What gets me excited about science? In which classes did I have no trouble staying on the edge of my seat? What topics in those classes were my favorites? As you think about this, check the [web site where faculty describe](http://www.biology.ucsc.edu/mcd/faculty.html) their research (<http://www.biology.ucsc.edu/mcd/faculty.html>). You can also go to [PubMed](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed) (<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed>) and search by faculty name for recently published papers. Some labs have their own pages, these can be very informative, and can usually be found on [Google](http://google.com) (<http://google.com>). Either way, **READ THE PAPERS!** Or try at least, and if they interest you, go to the faculty member's office hours with your questions about their work. If you are excited and curious about the work from the papers, there is sure to be more the faculty member can tell you that is not yet published. If you are more excited after this discussion you should ask the faculty member whether there is room in the lab for you to try to work on the problem.

Some common barriers have been observed. Some faculty are not available, either because their labs are already packed, or they have many other commitments such as teaching or serving on committees, or just generally being too famous or something that they have little time to direct you on a project. Although all faculty are required to post office hours, those without large courses to teach that quarter may tend not to actually BE in their offices. If you find this happens, you could send an email saying you stopped by for office hours and asking if there is a better time to come by with questions about the paper the lab published last month, etc, etc.

Talking with professors can be scary. You may feel like you may not know the answer to an unexpected question and might be afraid to look stupid. It is natural to feel this way, but actually most professors do not take glee in making people feel stupid. Often people start to feel stupid just because they are near a professor, so don't fall into that trap, either. Go in with the idea that a professor is just a reasonably normal person with an extremely abnormal fascination with some very small slice of the world. You are going in because YOU have questions, presumably because you DON'T know everything. If the questions you have are honest, it should not be a problem. So have some questions, and show that you have tried to do some homework and thinking on your own.

If all goes well you will be working in the lab that afternoon. But in reality it may take some time. Your conversation may be cut short, you may be given a new bunch of papers to read, the new ones even more difficult than the ones you already struggled with. Some professors do this as a test of your interest and persistence. If they send you out the door with more reading and a "come back later", your best bet (if you are still interested) would be to do the reading and come back later, with more questions. If the faculty member really has no space or resources to support you, DO NOT take it personally. It is very often the case that labs are full, and money and time are tight. MCD research unfortunately takes money, and sometimes another lab "mouth to feed" may just not be in the cards. Things change, grants appear on occasion and space can open unexpectedly. Ask the professor if it would be worth it for you to check back next quarter or during the summer, and if the response is yes, then do it. Simple timing can play a big role. If things don't work out right away at your first choice lab, keep looking.

There are some things not to do. One is to "bring your own project". Few undergraduates have the experience to extract relevant information from the literature, develop a strong hypothesis on a key question, design and execute experiments and then analyze and interpret their results. If they did they would be professors! Lab funds are generally tied to federal grants for projects that have been thoroughly reviewed by panels of experts BEFORE they are funded. You are asking to play on the team. I actually had one student tell me that their tuition paid for my research and that was why they should be allowed to work in the lab. Needless to say, taking the position that you are OWED an opportunity to work in whichever lab you want is not a winning strategy!

SHOW UP and be READY to WORK HARD!

GOOD LUCK!!